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No. 345.

PRESENTED BY

Stephen Van Rensselaer.

THE

MINERAL CONCHOLOGY

OF

GREAT BRITAIN;

OR

COLOURED FIGURES AND DESCRIPTIONS

OF THOSE

REMAINS OF TESTACEOUS ANIMALS

OR

Shells,

WHICH HAVE BEEN PRESERVED AT VARIOUS TIMES AND DEPTHS IN THE EARTH.

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JAMES D. C. SOWERBY, F.L.S. Z.S. &c.

Many, O Lord my God, are thy wonderful works which thou hast done; they cannot be reckoned up in order to thee: if I would declare and speak of them, they are more than can be numbered.—PSALM xl. 5.

VOL. VI.

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CORRECTIONS AND OBSERVATIONS.

Page 5, last line, *for* Oxford, *read* Kimmeridge.
6, et seq. Obs. Ancliffe is otherwise called Hanckley, it is in the parish of Westwood in Wiltshire.
17, line 19 et passim, *for* Lyas, *read* Lias.
34, to EMARGINULA scalaris, *add* fig. 4.
41, line 15 et passim, *for* Melanea, *read* Melania.
51, line 18, *for* carinatus, *read* carinata.
63, *add* a comma *after* ANCYLUS.
69, line 5, *after* numerous, *add* granulated.
line 9, *add* the striæ become smooth by age.
93, line 1, *for* lævigatus, *read* Selliguinus. *Add* SYN. A. Selliguinus? *Cuvier & Brongniart Env. de Paris*, 394 *t.* 7. *f.* 1.
Obs.—Our fossil is between A. Selliguinus and A. Beudanti of Brongniart: the latter is not uncommon at Folkstone, and varies much,—may they not all be one species?
102, last line but 1, } *for* Brambury, *read* Braambury.
108, last line but 2, }
157, line 1, *for* priscus, *read* prisca.
166, line 1, *for* tetrammata, *read* tetrammatus.
185, last line but 1, *dele* lower beds of.
Obs.—It appears that the Baculites Faujasii is from the *upper* Chalk.
191, line 5 from the bottom, *for* renders, *read* render.
193, line 13, *for* Trachelepodous, *read* Trachelipodous.
213, line 4 from the bottom, *for* priscus, *read* prisca.
226, *for* TURRITELLA concava, *read* TURRITELLA excavata, *and add* SYN. Cerithium excavatum, *Cuvier & Brongniart, Env. de Paris*, 399, *t.* 9. *f.* 10.
Obs.—We had published this as a Turritella before we observed that Brongniart had given it as a Cerithium: we retain our generic name, which Brongniart seems inclined to think may be right.

PACHYMYA*.

GEN. CHAR. Shell bivalved, transversely elongated, very thick, sub-bilobate, with the beaks near the anterior † extremity. Ligament partly immersed, attached to prominent processes or fulcra.

A STRONG analogy exists between this genus and Modiola, evinced by the position of the beaks, the elongated form of the valves, and the partial separation of the anterior portion into an imperfect lobe. But a closer inspection shows that it is rather related to Cypricardia and several other genera which have a comparatively short ligament, and that, fixed upon a strong prominent part of the shell within the edge, not linear and affixed to narrow edges, as in most of those thin shells that are allied to Mytilus. The great thickness of the valves, their depth, and the ridge that crosses them obliquely, help to distinguish this from other genera, independently of the hinge teeth, which we regret not having seen.

It is probable that several fossils hitherto described as Modiolæ will, when better known, prove to belong to this genus.

* From παχὺς (*crassus*) and Mya, another genus which this resembles.

† We purpose in this volume to use the terms *anterior* and *posterior* in their correct sense, as pointed out by the situation of the mouth of the animal.

PACHYMYA Gigas.

TAB. DIV. and DV.

SPEC. CHAR.....

A GIBBOSE heavy shell, above twice as wide as long; the thickness also exceeds the length. It is slightly curved, with parallel edges. The anterior extremity is small, rounded; the posterior, rather truncated; they are both close. The valves are rendered obliquely boat-shaped by a ridge that runs from the beaks to the lower extremity of the posterior edge; the surface is smooth except towards the margin, where it is formed of the imbricated edges of laminæ.

We are indebted to the zeal and kindness of H. T. De la Beche, Esq. for the opportunity of representing this extraordinary shell: it is from the Chalk with quartzose grains at Dowlands, the lowest part of the Chalk formation in the vicinity of Lyme Regis.

The generic name suggested by Mr. De la Beche ex-

ORBICULA Lamarck.

(Discina, *Lamarck.*)

GEN. CHAR*. "Bivalve, inequivalve, nearly orbicular, compressed, fixed; upper valve patelliform, with 4 internal muscular impressions, two rather large and approximating near the centre, and two smaller and more distant, placed near the posterior margin. Lower valve flat, with corresponding muscular impressions and a rather obtuse process placed at the inner end of a fissure near the centre. Hinge none."

"THE animal has two ciliated arms or tentacula, and adheres by a muscle or ligament which passes through the fissure."

Little can be added to the above detailed Gen. Character. The shells that compose the genus are thin and rather coriaceous. The animals contained in them are analogous to those of Terebratulæ and other Branchiopoda; but the foot or byssus, instead of passing through the beak of one valve as in Terebratula, and being inclosed in a tube, passes through the disk and spreads immediately upon the stone it is attached to.

Two recent species are known; they are described, in the thirteenth volume of the Linnean Transactions, by my brother: and we have now the pleasure of adding three fossil ones, two of them from the collection purchased by him from the late Mr. G. Humphries, whose merits and penetration have unfortunately been rendered of little service to the scientific world.

* Trans. Linn. Soc. vol. 13. p. 466.

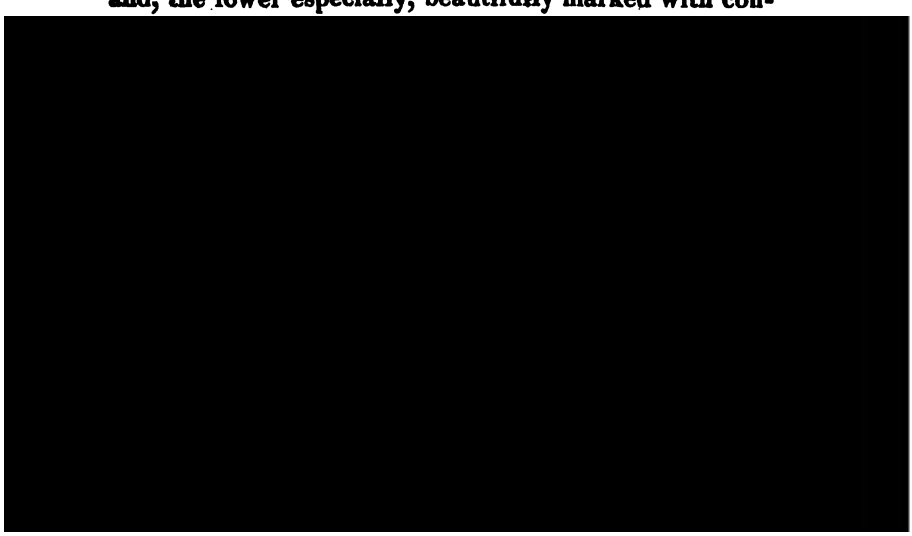
ORBICULA reflexa.

TAB. DVI.—*fig.* 1.

SPEC. CHAR. Shell subelliptical, most pointed towards the back, polished; upper valve rather convex, with the vertex near the posterior margin; lower valve flat with a nearly central vertex, the margin reflected; sinus for the byssus large, elongated.

SYN. Orbicula reflexa. *G. B. Sowerby, Zoological Journal, v. 2. p. 321.*

ALTHOUGH a great part of the lower valve is flat, yet the portion behind the focus or apex is concave, being gradually bent inwards towards the sinus, which extends from the focus to the margin, and terminates where that begins to be reflected. The upper valve covers the reflected edge of the lower, in the same way that the upper valve covers or incloses the other in the genus Producta. Both valves are smooth and very thin; and, the lower especially, beautifully marked with con-



many hundred unknown shells and numerous marks of a scientific mind,—in Mr. Humphries's collection, which had been for many years unopened when my brother purchased it and disclosed its riches. It is remarkable that both valves should always be found, and no substance accompanying them to which they may have been attached: but this is partly accounted for by the nature of the attachment, which would fail upon the death of the animal, and by the elastic texture of the valves, which, as one is inclosed in or grasped by the other, would still hold together. We know of but one other specimen; it is a single individual attached to Nucula Ovum: both are filled with indurated clay. It is in the cabinet of John Hogg, jun., Esq., who obtained it near Whitby, from the Alum Clay.

ORBICULA Humphriesiana.

TAB. DVI.—*fig.* 2.

SPEC. CHAR. Conical, orbicular, marked with diverging striæ; apex elevated, rather excentric, obtuse.

MUCH resembling the O. norvegica; but it is a higher and more regular cone, is more deeply striated, and thicker. We do not know the lower valve.

Found attached to Ostrea deltoidea (M. C. 111.) in Mr. Humphries's collection, with a label marked "Collinson's Sale, at Langford's." We suspect it to come from the Oxford Clay at Shotover Hill.

ORBICULA granulata.

TAB. DVI.—*figs.* 3 and 4.

SPEC. CHAR. Conical, orbicular, marked with granulated radii; apex elevated.

A MORE elevated and regular cone than even the last: but the sides are rather rounded; the diverging lines are elevated, and rendered granular by the lines of growth. We have not seen the other valve.

This shell had passed for a Patella, but its orbicular form gave rise to some doubts: and we now venture to place it under the genus Orbicula, in consequence of its strong resemblance to the last species.

From the Ancliffe Oolite in the collection of the Rev.

TRIGONIA nodosa.

TAB. DVII.—*fig.* 1.

SPEC. CHAR. Obovate, depressed; anterior part covered with rows of large knobs, a portion of the posterior part plain; superior edge straight.

A LARGE rather depressed species: two or three rows of slightly elevated tubercles extend from the beaks towards the posterior margin, which is truncated irregularly: from that row of tubercles which passes over the disk, 8 or 10 others extend obliquely over the whole of the anterior portion. Much resembling T. dædalea (M. C. 88.); but it is larger, and the tubercles are less numerous, and do not cover the posterior portion. Casts of the insides have been preserved in Mr. Sowerby's Museum since 1815: they were found in the Green-sand at Hythe in Kent.

TRIGONIA imbricata.

TAB. DVII.—*figs.* 2 and 3.

SPEC. CHAR. Transversely oblong, depressed; with 5 or 6 concentric, dentated, subimbricated keels upon the rounded anterior side; posterior side obliquely truncated, ribbed.

THE carinæ upon the surface of this little shell resemble terraces one above the other; each is divided into 4 or 5 angular lobes.

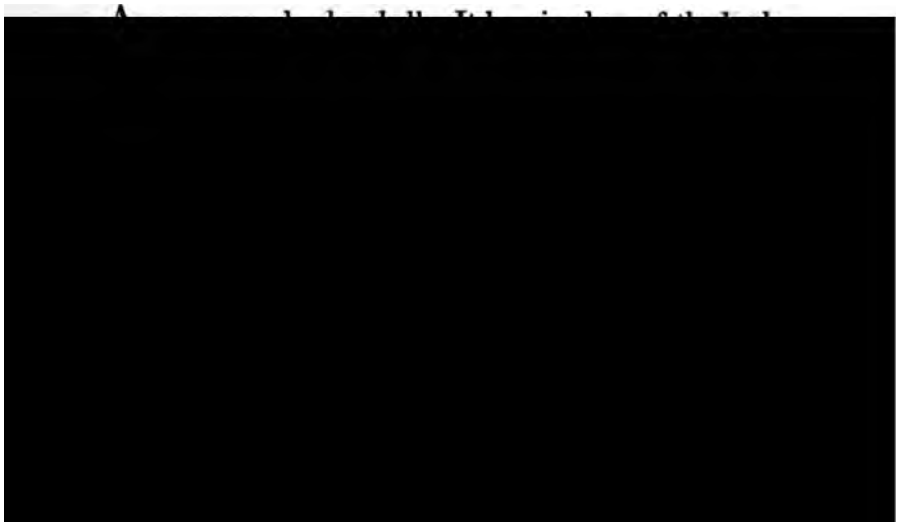
Imperfect specimens of this Trigonia occur in the Rev. Mr. Cookson's collection of Ancliffe fossils.

Fig. 3 is enlarged.

TRIGONIA cuspidata.

TAB. DVII.—*figs.* 4 and 5.

SPEC. CHAR. Obovate, depressed, ribbed; posterior side truncated, its lower angle pointed; ribs concentric, with projecting angles where they pass unto the posterior side.



TRIGONIA angulata.

TAB. DVIII.—*fig.* 1.

SPEC. CHAR. Transversely elongated, convex; posterior side produced, truncated, transversely striated, bounded by a crenulated line; the remainder ornamented with nodose ridges bent at right angles as they pass over the middle.

SYN. Trigonia clavellata var. *Min. Conch. t.* 87. *lower figures. Vol.* i. *p.* 197.

UPON the posterior side are not only transverse striæ, but there is generally a crenulated ridge in the middle of it; the crenulations upon this and also upon the bounding lines are often elevated into small spines. The curvature, like the letter S, of the concentric ridges, which are sometimes divided into distinct tubercles, and at other times continuous, is a strong and constant character. The portion above the anterior side (corresponding with the lunette in other shells, but very large in this) is smooth. The breadth seldom exceeds an inch and a half.

An excellent specimen lately lent us by our good friend Thomas Meade, Esq. has shown this to be a distinct species, which the imperfect specimens formerly figured were not sufficient for. It is from Brewham near Nunney. The accompanying shells are Astarte elegans (M. C. 137.), an unpublished one, resembling a Tellina, and, at the back of the mass, fragments of a smooth Pecten.

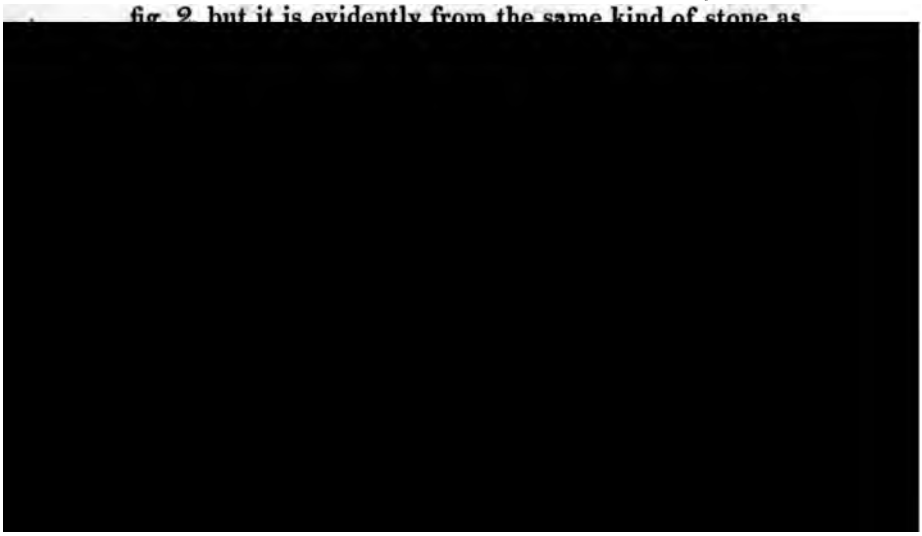
TRIGONIA Pullus.

TAB. DVIII.—*figs.* 2 and 3.

SPEC. CHAR. Obovato-triangular, with transverse smooth ribs; posterior side obliquely truncated, marked with several crenulated ridges and bounded by a strong crenulated keel; lunette large, regularly striated across.

THIS so nearly resembles T. costata (M. C. tab. 85.), that it is doubtful whether it may not be the young state: the only marked difference, except size, is the regular somewhat curved set of elevated lines that cross the lunette at right angles with the edge of the shell, in place of irregular lines of growth; the form is not quite so angular, and the ridge that separates the posterior side projects beyond the edge.

I am not acquainted with the locality of the specimen fig. 2, but it is evidently from the same kind of stone as



PALUDINA elongata.

(Gen. Vivipara, Vol. i. p. 75.)

TAB. DIX.—*figs.* 1 and 2.

SPEC. CHAR. Ovato-lanceolate, smooth; volutions 5, convex; aperture elongated.

WELL distinguished from the other species of Paludina by its great length, which equals twice the diameter: it resembles the recent species common in fresh water every where (Helix tentaculata *Linn.*), but is larger and even longer in proportion than that is.

When Vivipara Fluviorum (Paludina vivipara of Lamarck) was published in Mineral Conchology, it was not known that fresh-water formations were to be found below the Chalk; nevertheless the probability of one was pointed out by that shell. The existence of several species of Paludina, of bivalved shells belonging to the fresh-water genus Cyrena, and of Cypris, in the strata between the Green-sand and the Portland Rock, indicate this range to be of fresh-water origin. (See Dr. Fitton's paper in the Ann. of Phil. vol. viii. N. S. p. 379; and Mineral Conchology, vol. v. p. 138. tab. 485. Cypris.)

Dr. Fitton has favoured us with specimens out of the Weald Clay, in hard ferruginous clay ("Clay-Iron-stone"), from Compton Grange Chine in the Isle of Wight. Most generally only the cast of the shells remains, but in that selected for representation the shell is preserved (fig. 2.): it is accompanied with Cyrena and Cypris. The same shell also occurs less perfect in laminated Clay and in "irregular concretional masses of hard calcareous grit:" in the latter the shells are often filled with sulphate of barytes.

We have taken fig. 1. from a mass of Limestone, upon the surface of which the shells are tolerably perfect, although within they appear to be crushed (a cir-

cumstance that, however curious and difficult to account for, is not uncommon), and from some detached individuals that were collected at East Peckham in Kent by J. B. Dorient, Esq. Although we cannot detect the Cypris among these, we suppose they come from the beds of Limestone subordinate to the Weald Clay: some fragments of the fibrous carbonate of lime resembling "Curl" mentioned by Dr. Fitton (p. 374, note) occur with them.

PALUDINA carinifera.

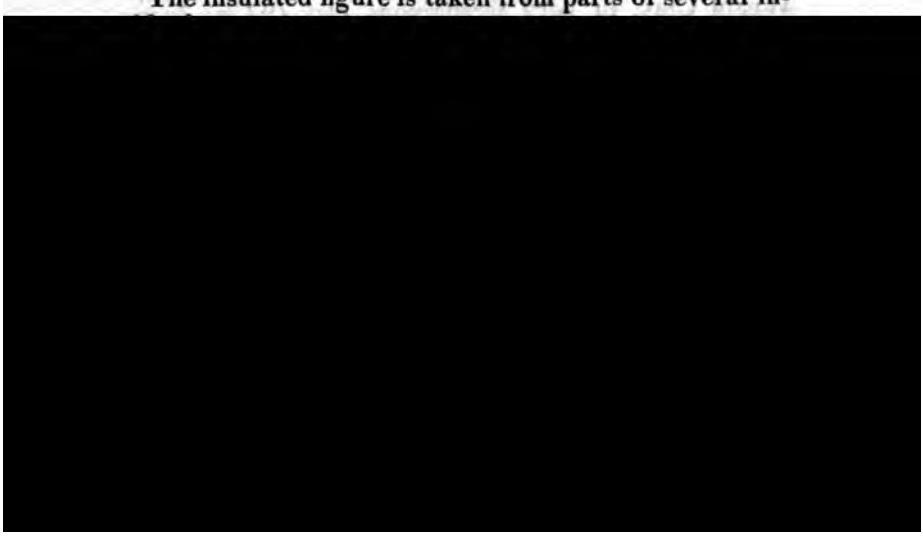
TAB. DIX.—*fig.* 3.

SPEC. CHAR. Ovato-conical, smooth; volutions 4, convex, the upper two bounded by a linear keel at the lower edge.

NOT much longer than wide, and rather blunt; the thread that runs round the sutures of the two upper whorls is a strong character.

From one of the upper beds of Purbeck Limestone. In the interior of the mass the shells are more completely crushed than in that from East Peckham just mentioned: it contains fragments of some bivalve.

The insulated figure is taken from parts of several in-



GERVILLIA, Defrance.

GEN. CHAR. An unequal-valved, unequal-sided bivalve, oblique, much elongated; beaks near the anterior extremity; hinge long; divided into several pits, and furnished with many, more or less lamelliform, teeth; one muscular impression in each valve.

A GENUS nearly related to Perna. The species upon which it is founded has nearly parallel edges; but several others that possess the same characters in the hinge, are ovate, and more or less taper towards the extremities. The hinge consists in a long transverse area, containing 3 or more shallow hollows destined to receive the ligament; about the inner edge of this area are a number of irregular interlocking lamellar teeth, varying in their direction and size in different parts of the same hinge and in different species; those placed towards the anterior extremity are, in the type of the genus, small and longitudinal; the others long and transverse: in other species they are all either oblique or transverse. The casts of the typical species indicate a shell that gapes at one if not at both extremities; the other species are close. The shell in all is thick, and probably consists chiefly of pearl.

Mons. Defrance established this genus in the *Dictionnaire des Sciences Naturelles*, from casts discovered by Mons. de Gerville,—in commemoration of whom he has named it, and thus done honour to a Naturalist whose zeal and urbanity justly merit it.—Other species have been added to it by Mons. Eudes-Deslonchamps, in consequence of the resemblance in their hinges. Hereafter these will form at least a sub-genus.

GERVILLIA solenoides.

TAB. DX.—*figs.* 1 to 4.

SPEC. CHAR. Transversely much elongated, depressed, smooth; edges parallel; anterior extremity truncated, open; teeth of the hinge numerous, variously disposed.

SYN. Gervillie solénoide. *Defrance, Dict. des Scienc. Nat. v.* 18. *p.* 503. *cahier* 16. *pl.* 18. *f.* 4.
Gervillia solenoides. *Eudes-Deslonchamps, Mem. de la Soc. Linn. du Calvados,* 1824. *p.* 129.

A LONG, narrow, slightly curved shell; the hinge contains about four depressions for the reception of the ligament: the teeth within are irregular and linear; those on the anterior extremity are most elevated and placed perpendicular to the hinge line; the others are in the same direction with it, and often curved: the anterior extremity appears to be open, perhaps for a byssus; the other we have not seen. The shell is at least eight times as wide as it is long.

Many imperfect casts of this extremely curious shell were collected in 1818 at Shanklin Chine in the Isle of Wight by my father, in the lowest ferruginous beds of the Green-sand (fig. 2. and 3.); and immediately identified with casts from Normandy, which he had received from his highly valued correspondent Mons. de Gerville. The discovery of the same fossil, with a portion of the shell

GERVILLIA ? acuta.

TAB. DX.—*fig.* 5.

SPEC. CHAR. Ovate-lanceolate, oblique, narrow, depressed, slightly curved; anterior extremity acute; teeth in the hinge variously disposed.

EXTERNALLY this shell exhibits a few lines of growth; it is comparatively thin: its width (the longest measure from the two extremities) is four times its length; the anterior portion is rather remarkably attenuated, the other extremity is rounded. Found in a calcareous sand-stone at Collyweston, by the late Lady Wilson. We have not been able to ascertain whether this have any hollows in the area of the hinge destined for the ligament, as that part is not visible in the specimen, although there are four or five casts of the inside, and one or two of the outside upon it. The thinness of the shell would lead us to think it an Avicula, were not the teeth so large, and differently placed.

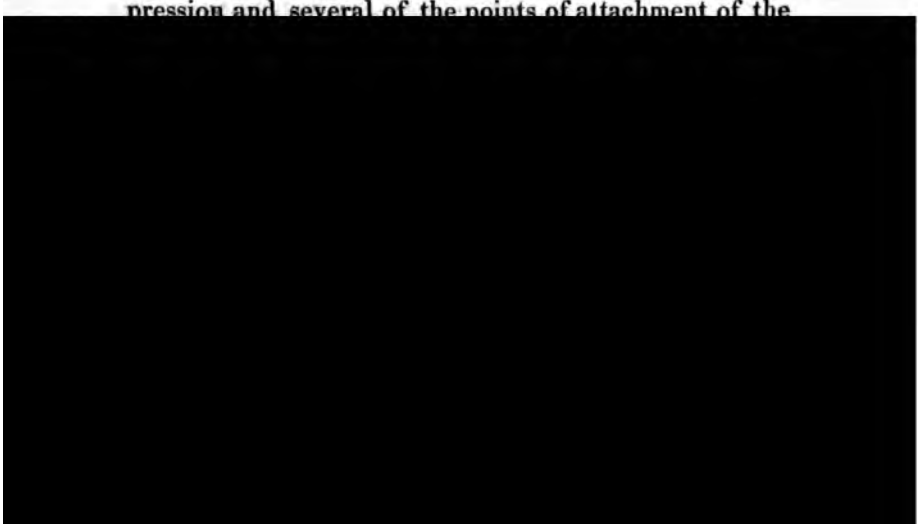
GERVILLIA aviculoides.

(Perna aviculoides. *Min. Conch.* tab. 66.)

TAB. DXI.

SPEC. CHAR.* Obliquely ovato-lanceolate, curved; both extremities pointed; hinge line nearly half the length of the shell; hinge teeth few, similarly disposed. Distinguished from G. pernoides of Mons. Deslonchamps above quoted, by its more pointed form.

AT the request of several friends, and for the purpose of further illustrating this species, we have given a second plate of it. It belongs to that division of the genus in which the lamellar teeth of the hinge are all nearly in the same direction. Fig. 1. is from a remarkably fine specimen in the cabinet of our kind friend J. Vine, Esq. It exhibits the opposite valve to those figured on tab. 66. Fig. 2. is a portion of the hinge with two lamellæ. Fig. 3. shows a front view of both valves, in which their difference is seen, one having a shallow furrow along it, which the other wants. These three specimens are from the Shanklin Sand. Fig. 4. is a cast of the inside, picked up on Shotover Hill, Oxford; it shows the muscular impression and several of the points of attachment of the



AVICULA lanceolata.

TAB. DXII.—*fig.* 1.

SPEC. CHAR. Transversely linear-lanceolate, compressed; posterior wing large, obtuse-angled; anterior wing minute, pointed.

SIX times as wide as long, very flat; the beaks are very near the anterior extremity; the posterior extremity is narrow and blunt; the posterior wing extends about one third the width of the shell: it is in no part distinct, but runs along the superior edge; its two edges, one of which is a continuation of the hinge line, meet at a very obtuse angle.

A very remarkably formed shell (if in fact it be a shell) strongly resembling the external bony appendages to the abdominal fins of several fishes: the manner in which the pair is displayed strongly favours this resemblance, and is by no means common among fossil shells.

Figured from a specimen in the cabinet of H. T. De la Beche, Esq., who found it in the Blue-Lyas of Lyme Regis, Dorsetshire.

The shell is imposed upon a plate consisting of perpendicular fibres, of grey carbonate of lime, imbedded between the laminæ of the slaty clay that composes a great part of the Lyas stratum. It is accompanied by a small Pecten.

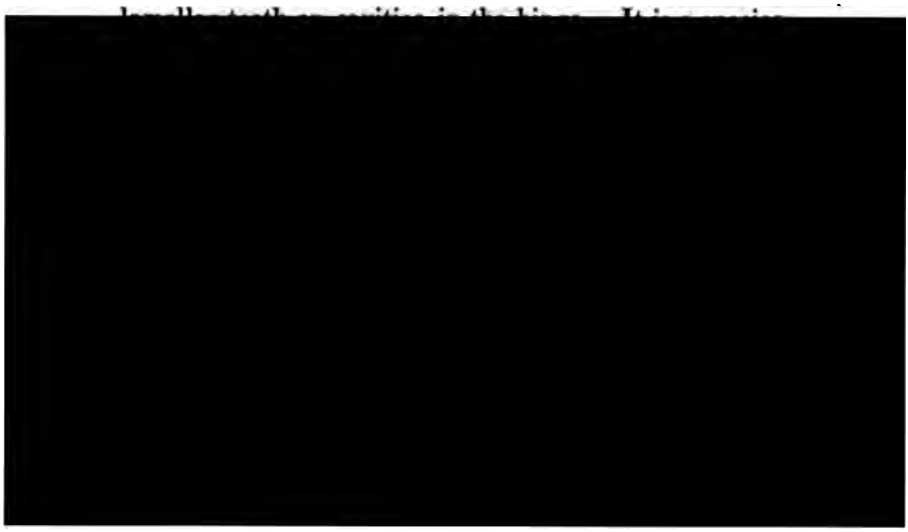
AVICULA ovata.

TAB. DXII.—*fig.* 2.

SPEC. CHAR. Transversely ovate, convex; posterior side elongated, blunt; hinge line long, forming part of the posterior wing, which is not distinct.

A SLIGHTLY curved shell, much approaching in form to a Gervillia; the hinge line occupies more than half the width of the shell: the wings do not project beyond it, but are rectangular, and raised upon the upper edge of the shell; the beaks are rather prominent.

This may easily be taken for a short variety of Gervillia acuta (tab. 510.): but we can detect no indications of



THETIS *.

Gen. Char. An equivalved subequilateral bivalve; more or less orbicular, and convex; ligament marginal; 3 or 4 small acuminated teeth about the hinge; the line of attachment of the mantle? has a deep sinus extending nearly to the beak; muscular impressions rounded, small, distant from the hinge. Ligament external.

This genus bears some resemblance to Mactra; but the ligament is not internal, nor are there any remote teeth. It also comes near to Tellina, but its margin is not curved laterally. The shell is thin, with small incurved beaks: the leading feature is a line within, which, taking an irregular sweep from the anterior muscular impression over the middle of the valve, turns suddenly up, almost to the beak, then bends down again in a nearly parallel direction for some distance, and at last proceeds to the posterior impression. This line has much the appearance of the mark formed by the attachment of the mantle; but the sinus in it is so remarkably directed that we are led to doubt, more especially as we have only observed fossil examples. There is no lunette or other external mark, the surface being nearly smooth and plain. The teeth about the hinge are unequal: the two interior ones are largest, conical, and slightly curved; the other two, if there be more than one, are small.

The fossils composing this genus have been referred to Venus, but are totally distinct.

* The elegant symmetry in the form of the shells of this genus render it worthy of the name of this beautiful Sea Nymph.

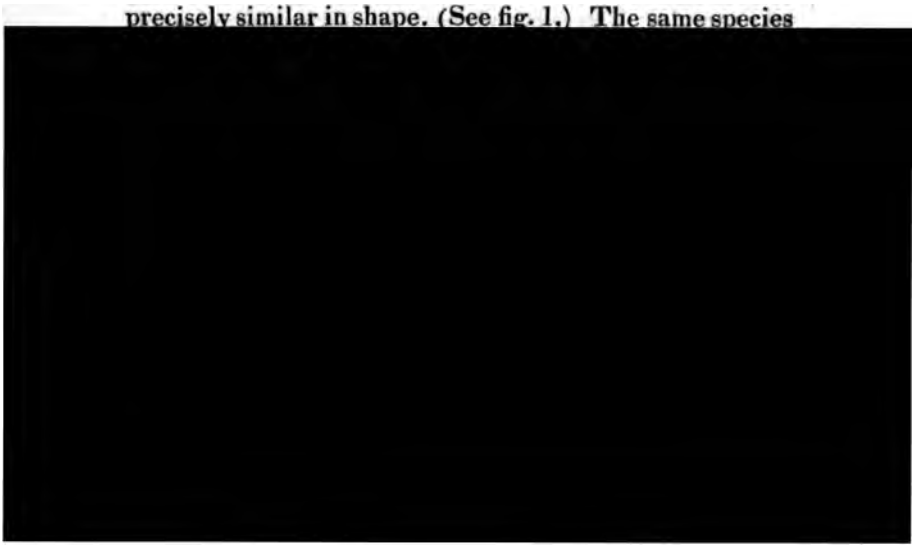
THETIS major.

TAB. DXIII.—*figs.* 1. to 4.

SPEC. CHAR. Convex, orbicular; posterior edge rather angular; beaks small.

OFTEN two inches wide, and nearly as much long; extremely thin: the surface is plain and smooth, except numerous longitudinal rows of very minute rising punctums, probably epidermis: the beaks are small, sharp, and curved close together.

The size and a less degree of convexity are almost the only points in which this differs from the following. The most perfect specimens we have met with, were collected at Blackdown, in 1812, by Miss E. Hill; they are siliceous casts imbedded in Sandstone, and do not appear to have undergone any violence, as they are regular and precisely similar in shape. (See fig. 1.) The same species



THETIS minor.

TAB. DXIII.—*figs.* 5 and 6.

SPEC. CHAR. Gibbose, wider than long; posterior edge rounded.

SYN. Venus. *Mantell, Geol. of Sussex, p. 73. no. 12.*

GENERALLY about an inch wide, but sometimes nearly an inch and a half: it is more convex and has larger beaks than the preceding species; the surface has the same kind of punctums, but they are very seldom to be traced in the circumstances under which the individuals are commonly presented to us.

An immense number of very perfect casts of this neat shell occur in the hard ferruginous masses of the lower Green-sand at Parham Park in Sussex, and Shanklin Chine in the Isle of Wight. Specimens from the former spot have long been in Mr. Sowerby's Museum, where they were deposited by G. Mantell, Esq.; those from the latter place (fig. 6.) were collected by my father himself, in 1818. H. T. De la Beche Esq. has also discovered it in the lowest Green-sand near Lyme Regis, where the earthy matter of the shell still remains (fig. 5.); but the shells

are often much distorted. They are in all these places accompanied by various other shells, especially by Trigonia aliformis and two unpublished species of Rostellaria, which, as far as the very imperfect fragments hitherto obtained will indicate, are nearer allied to the R. Pes Pelicani, than they are to R. Parkinsoni.

Since the Plate was engraved, we have met with a beautiful white individual of this species, from Blackdown, in which the short, cylindrical, external ligament is very neatly cast in Silex.

AMMONITES Taylori.

TAB. DXIV.—*fig.* 1.

SPEC. CHAR. Discoid, radiated; inner whorls exposed; radii about 12, with one large spiniform tubercle upon each side of the front, and one or two slight elevations on the rounded sides of the whorls; aperture nearly round.

APERTURE rather transverse, not quite one-third of the diameter of the shell long: there are about three whorls; the inner ones are small, but almost wholly exposed to view.

Found in a water-worn mass of indurated Clay approaching Ironstone, and containing Blende, in Happisbury Cliff, where it was probably alluvial.

For the use of the specimen I am indebted to R. Taylor, Esq., of Norwich, whose assiduity in collecting and drawing the fossils of the Cotswold Hills, and other Geological researches, have induced me to yield to friendly inclinations in commemorating his name.

AMMONITES Hippocastanum.

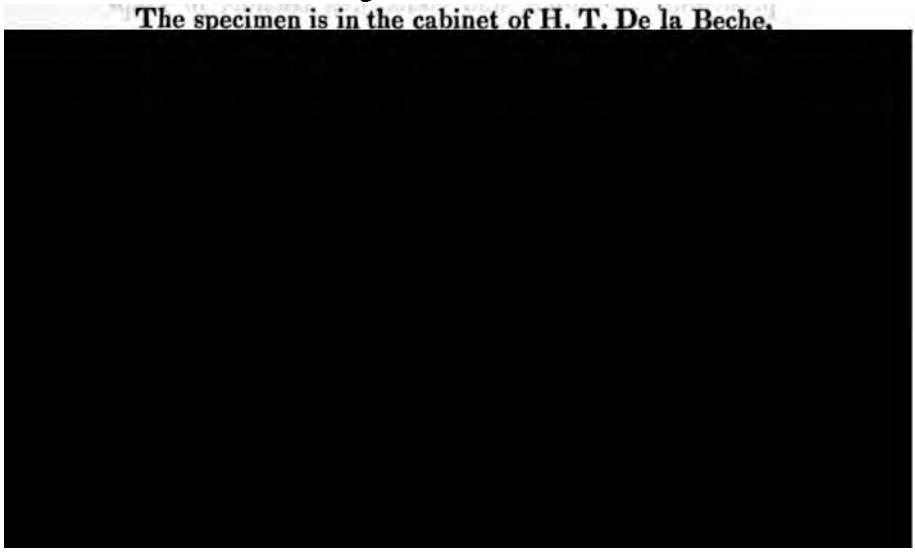
TAB. DXIV.—*fig.* 2.

SPEC. CHAR. Gibbose, umbilicated, radiated, spinose; inner whorls almost concealed; radii ten or more, unequal, much elevated, each furnished with three tubercles upon the front, and most of them with two obtuse spines upon each side; aperture transversely obovate.

DISTINGUISHED from A. rhotomagensis by the convexity of the sides of the whorls, the small number and thickness of the radii, and the size of the spiniform tubercles; the thickness equals two-thirds of the diameter at least.

At first sight this fossil has a very striking appearance, although upon examination it is found to be very nearly allied to the following.

The specimen is in the cabinet of H. T. De la Beche,



AMMONITES rhotomagensis.

TAB. DXV.

SPEC. CHAR. Discoid, radiated, umbilicated; inner whorls partly concealed; radii about 20, furnished with three short tubercles upon the front, and two more or less elevated upon each side; whorls thick, with flattish sides; aperture oblong.

SYN. Am. rhotomagensis. *Cuv. & Brongn. Env. de Paris, p.* 83. *t.* 6. *f.* 2.

Am. sussexiensis. *Mantell, Geol. of Sussex, p.*114. *t.* 20. *f.* 2. *and t.*21. *fig.* 10.

IN the centre of the rounded front of this Ammonite is a row of tubercles, one placed upon each rib; on each side of this is another similar row: these, together with the flattened sides and wide umbilicus, are the distinguishing characters; the other two rows of tubercles are very variable, the outer one often rising into obtuse spines. When these tubercles are inconspicuous, it bears a strong resemblance to A. Man-

telli (tab. 176.); when they are large it comes still nearer to A. Hippocastanum, which may possibly be only a remarkable variety of it. Mr. Mantell observes, "it varies from a few inches to a foot in diameter."

Very abundant, but less so than A. varians (tab. 55.), in the lowest Chalk and Chalk Marl of Sussex, Wiltshire, &c., as at Hamsey, Bidcomb, and Rouën.

It is an unfortunate circumstance that two names should have been given to this Ammonite from its localities, and proves the impropriety of such names for fossils;—we retain that which we suppose to be the oldest.

ISOCARDIA similis.

TAB. DXVI.—*fig.* 1.

SPEC. CHAR. Transversely rather oblong, ventricose, slightly flattened; anterior side small, turned a little up; edge of the base nearly straight.

A LARGE strong shell, which differs from the recent Isocardia Cor only in having a straighter edge to the base, a larger anterior side, and a slight flatness of the middle of the disk. The base line being straight, makes it rather wider than long.

Found at Sandgate near Margate, in the upper Greensand. It consists of the original calcareous matter of the shell somewhat loosened in its texture.

ISOCARDIA Cor?

TAB. DXVI.—*fig.* 2.

FROM the small fragments that are sometimes found of an Isocardia in the Suffolk Crag, we are able to draw no other conclusion, than that they belong to the same spe-

cies which still inhabits the sea; but until nearly whole individuals are met with, it would not be just to speak too positively: for although several other of the Crag shells correspond with recent species, we must not be too hasty in supposing shells from distant parts to have been mixed accidentally with the Crag. Most, if not all the other shells that agree with recent ones, are such as may still be found on the neighbouring shores; while the nearest habitat of the Chama Cor is the Irish coast.

There are found near Verona, and in other places abroad, casts in limestone of an Isocardia resembling the Cor, but more ventricose, shorter, and smaller. Such probably occur in England, perhaps even at Heddington in Oxfordshire (see Plott's Oxfordshire, page 127); but we have not met with any specimen of which we know the locality. We propose to call it I. ventricosa.

UNIO Solandri.

TAB. DXVII.

Spec. Char. Transversely oblong-ovate, slightly arched, rather compressed, thin; both extremities obtuse; beaks small, rugose; hinge slender.

Syn. Mya Pictorum. *Brander*, 95?

Exactly twice as wide as long; the posterior extremity is rather square and more compressed than the other; the superior and inferior edges are parallel and a little arched; the beaks are slightly waved or rugose.

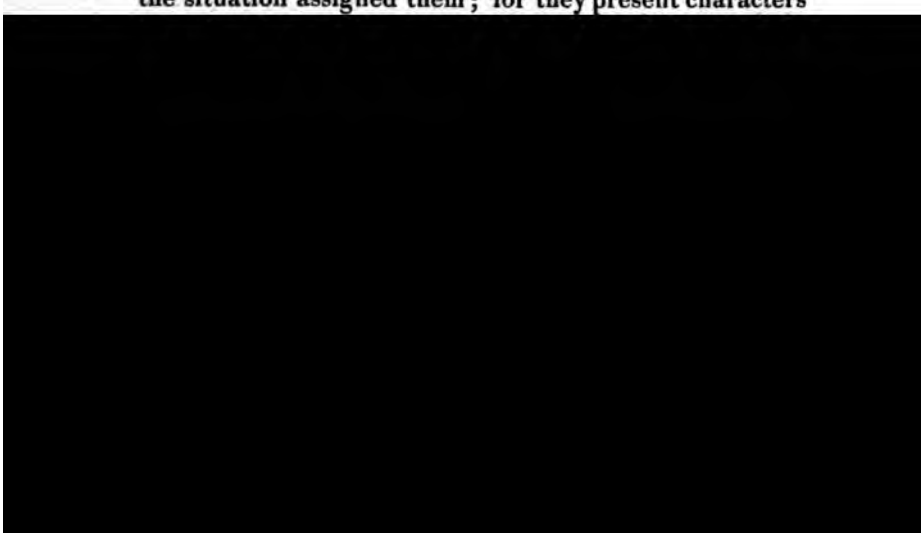
This beautifully pearly shell resembles the Unio batava of Lamarck, but is more compressed: it differs from U. Pictorum of the same author in the square form of the posterior extremity, and from both in being a little curved. It appears from the cast that the muscular impressions are not deep, and there is only a small space left for the hinge, the teeth of which we have not been able to extricate; the general contour of the shell, its rugose umbones, and brilliant pearl are so characteristic of the genus Unio, that even if the hinge were

never to be seen, no one would doubt the propriety of referring it to it: added to this, it occurs among decidedly fresh-water shells, such as Paludina lenta (M. C. *t.* 31.) in sandy clay in the lower freshwater formation of Hordwell.

Brander's fig. 95. does not accord in form with the shell before us: but as he has referred it to Mya Pictorum of Linnæus, and as we know of no other shell found at Hordwell at all resembling it, it is probable that his figure was taken from a specimen so mutilated as to give a very different idea of the shell, to that he had formed by observing a number of individuals. The shells themselves are exceedingly fragile, and the earth they are imbedded in so loose, that it is not often a cast can be preserved tolerably entire; so that his specimen might be much broken before it was drawn*.

We are indebted to the zeal and perseverance of our kind friend Charles Lyell, jun., Esq. for the knowledge of this Unio, which we consider a valuable addition to the list of freshwater fossils. It occurs in abundance, but it required much care to save two or three specimens.

The several fossils formerly published as Uniones require reconsidering before they can be established in the situation assigned them; for they present characters



VENUS caperata.

TAB. DXVIII.—*fig.* 1.

SPEC. CHAR. Orbicular, rather depressed, covered with small, rounded, concentric ridges; lunette cordiform, inconspicuous.

A NEARLY lenticular shell, but rather most gibbose near the umbones; the concentric ridges are numerous, sharply defined, rounded, and equal to the spaces between them. The hinge has a large tooth under the lunette in one valve, and in the other a laminated tooth within the posterior slope, besides those under the beaks. These teeth occur also in other species, and will serve, if not to distinguish a genus, to characterize a section.

Found replaced by silex on Blackdown many years ago by Miss Hill: the same has lately been observed by Mr. De la Beche in the vicinity of Lyme, along with the Gervillia (tab. 510.), in the lowest beds of the Greensand, where, although not only the earthy part of the shell but also the fibrous portion of the ligament are still remaining in a firm stone, the individuals are frequently as much distorted as the casts of shells generally are in the loose sand near Devizes.

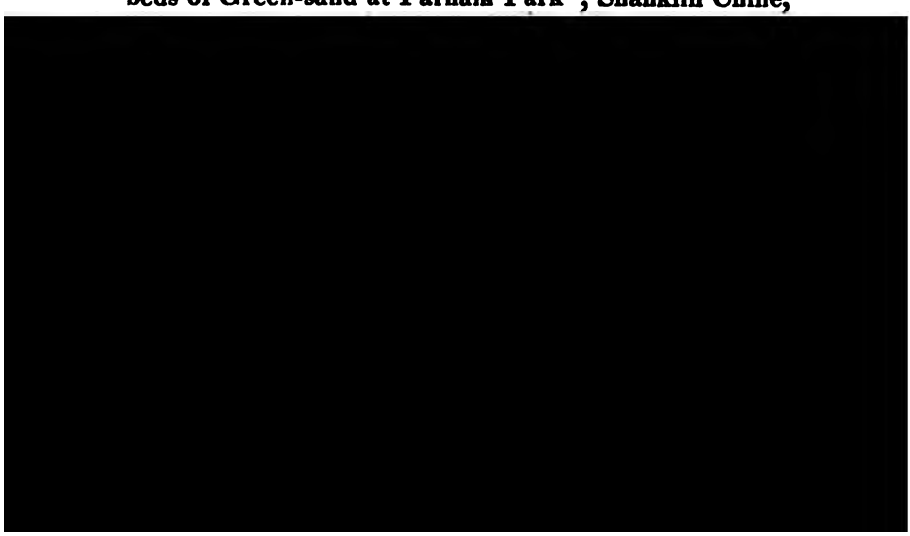
Figs. 1. and 3. represent Blackdown specimens; and fig. 2. is from a distorted one in the cabinet of H. T. De la Beche, Esq.—it shows a portion of the ligament.

VENUS parva.

TAB. DXVIII.—*figs.* 4, 5 and 6.

SPEC. CHAR. Transversely obovate, rather convex, smooth; lunette narrow.

THIS species is very nearly orbicular; its form is so simple that it is not easy to describe how it differs from shells of other genera with which it is associated, although an accurate eye will readily observe it even when its hinge is not discoverable,—the degree of its convexity and evenness of its surface are the most obvious marks of distinction; it is less convex, and has besides a larger hinge than Thetis minor (tab. 513.), but is more convex and smoother than another shell (probably a Lucina) that also occurs with it. The hinge, as far as can be learnt from casts, is similar to that of V. caperata above described. Abundant in the lower beds of Green-sand at Parham Park*, Shanklin Chine,



EMARGINULA ? *s.* FISSURELLA ? clathrata.

TAB. DXIX.—*fig.* 1.

SPEC. CHAR. An elevated curved cone; sides coarsely reticulated; longitudinal ribs about six on each side, and one central, which is split more than half way down from the apex; base oval; apex bent almost down to the base.

THIS little shell has the general form of Fissurella reticulata, but is more curved: it is however in all probability generically distinct, for we have not met with a specimen that has a notch in the margin; on the contrary, the central rib is split for a considerable distance from the apex; but as this does not appear to be perforated, but is acute, the propriety of referring the species to Emarginula is doubtful.

EMARGINULA tricarinata.

TAB. DXIX.—*fig.* 2.

SPEC. CHAR. Conical, with the apex bent down; surface marked with three principal and several lesser ribs, the spaces between them nearly smooth; base oblong.

THE three ribs upon the posterior portion of this Emarginula are very prominent; the middle one is divided by the marginal fissure, which gradually filling up as the shell grows, leaves a striated surface in the centre of it.

EMARGINULA scalaris.

TAB. DXIX.—*fig.* 3.

SPEC. CHAR. Conical, ribbed; apex excentric; ribs many, connected by numerous cross lines; base obovate.

ALMOST upright, the apex being very litttle bent forward; the ribs are equal, and the central one divided

ASTARTE striata.

TAB. DXX.—*fig.* 1.

SPEC. CHAR. Lenticular, transversely striated; lunette ovate, flat, deeply sunk, shell thick.

A VERY round shell, with small close beaks, and very numerous, regular, rounded furrows, or impressed striæ; the edge is obtuse, and probably entire.

Drawn from a Chalcedony cast sent me from Blackdown.

ASTARTE orbicularis.

TAB. DXX.—*fig.* 2.

SPEC. CHAR. Lenticular, rather gibbose, concentrically furrowed; furrows small; posterior surface plaited with an angle at its edge; lunette elongated, very deep.

THE convexity of this shell is rather greatest towards the beaks; the lunette is deeply sunk, and composed of two planes that meet at an acute angle in its middle; the shell is very thick, and has elongated crenulations within its edge.

Our specimens are from the Hampton Quarry near Bath: the shells are replaced by crystallized carbonate of lime, which has also retained the impression of the external ligament: they are imbedded in Oolite.

ASTARTE imbricata.

TAB. DXXI.—*fig.* 1.

SPEC. CHAR. Cordate, orbicular, largely imbricated, convex; tooth in the left valve beneath the lunette small; lunette elongated, flat; hinge line arched; edge finely crenulated.

THE surface is marked with about eight ridges one above the other, in the manner of tiles: these may possibly be exposed by wear, but their small number is remarkable.

ASTARTE nitida.

TAB. DXXI.—*fig.* 2.

SPEC. CHAR. Transversely obovate, angular above, rather depressed, minutely sulcated near the beaks, the rest even; beaks pointed; lunette lanceolate; edge crenated.

SOMEWHAT variable in form, the beaks being more produced and nearer to one side in some specimens than in others: all the varieties agree in being minutely and neatly sulcated around the beaks, while the rest of the surface is smooth and even; the whole surface is regularly convex.

ASTARTE bipartita.

TAB. DXXI.—*fig.* 3.

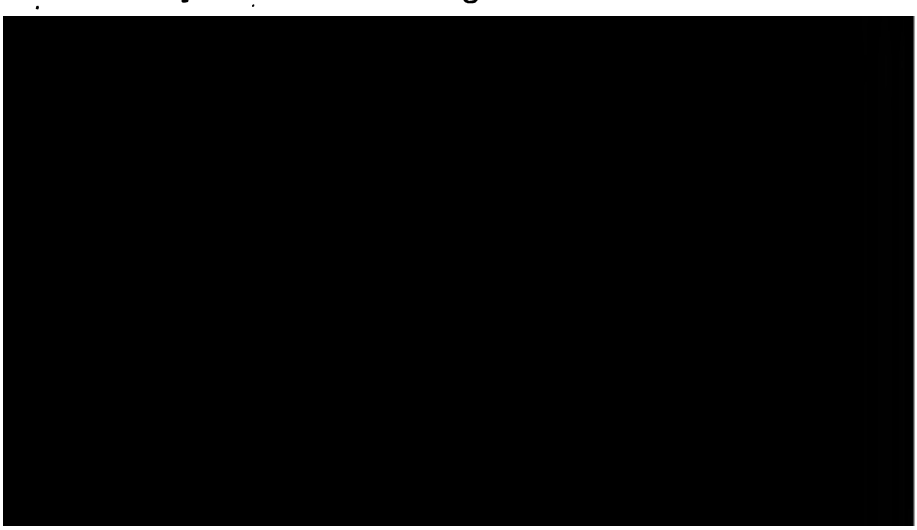
SPEC. CHAR. Obcordate, gibbose; six or eight large undulations upon a flat space near the beak, the rest of the surface even; beaks acute; edge toothed.

THE peculiar character of this shell is, that part of its surface is much flatter than the rest, and upon this portion are a few concentric waves, the rest of the surface being even and convex; the whole often appears distorted. In some specimens the two parts are not so distinctly marked: such are readily distinguishable from the last species by the size of the undulations, and the large, short, concave and smooth lunette.

ASTARTE oblonga.

TAB. DXXI.—*fig.* 4.

SPEC. CHAR. Transversely oblong, convex; surface largely waved; beaks small; lunette cordate, pointed, concave; edge crenated.



AMPULLARIA nobilis.

TAB DXXII.—*fig.* 1.

SPEC. CHAR. Subglobose, smooth; spire conical, composed of a few convex whorls; base very convex, not umbilicate; aperture elliptical, sublunate, pointed above.

A MAGNIFICENT although a simple formed fossil: there is a boldness in its contour that renders it handsome, and at the same time gives it a character very different from fossils in general. The shell does not appear to have been thick: it was externally slightly waved in the direction of the lines of growth; the spire is pointed, composed of about five whorls, and occupying one third the length of the shell: the aperture appears to be perfectly longitudinal, and equals half the entire length.

One of the products of that only recently explored mine of fossil shells, the Black Rock of Queen's County in Ireland. The substance of the shell is partly converted into calcareous spar, but principally almost incorporated with the black limestone.

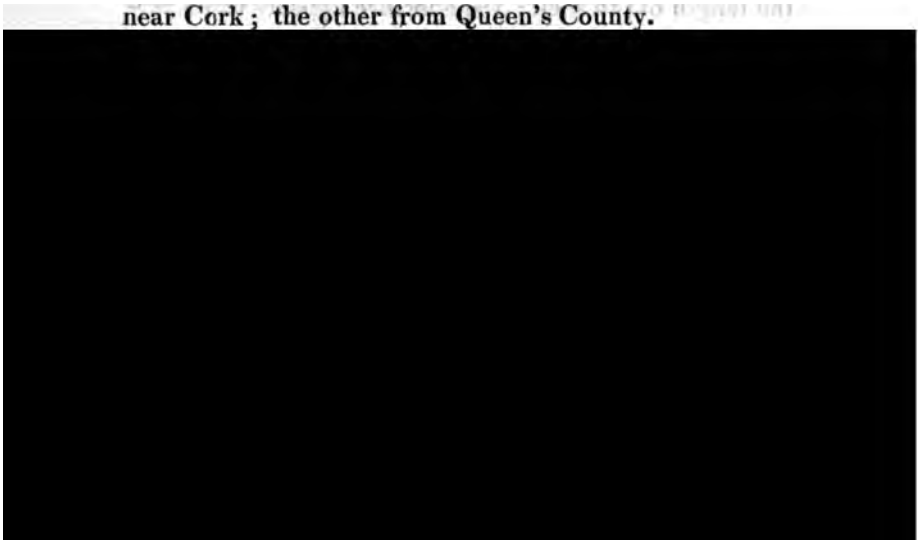
AMPULLARIA helicoides.

TAB DXXII.—*fig.* 2.

SPEC. CHAR. Almost discoid, smooth; spire very short, blunt; whorls nearly blended, round; base umbilicated; aperture oblong.

A PECULIARLY obtuse-looking shell, whose diameter is nearly double its length; the whorls are convex, but the sutures between them are not sharply defined; the umbilicus is of a moderate size; the aperture is longitudinal as in the last, it approaches much towards circular, with an indentation in its upper half made by the preceding whorl. Some individuals have an obscure band round the outer whorl.

Not very unfrequent in the black fœtid limestone of Ireland. The oval specimen, fig. 3. is, I believe, from near Cork; the other from Queen's County.



MELANOPSIS carinata.

TAB. DXXIII.—*fig.* 1.

SPEC. CHAR. Ovate, acuminated, with a sharp carina wound about the spire.

RATHER more than twice as long as wide, smooth; the last whorl flattened upon the sides, and sometimes having an obscure carina near its upper edge besides that projection of the edge which higher up the spire forms a sharp, spiral keel; the aperture is elongated, its upper part rendered even linear by the large callus upon the inner lip.

Found abundantly in a light greenish clay in a well near Newport, Isle of Wight, by Mr. Sowerby, in 1818, accompanied by Potamides ventricosus (tab. 341. fig. 1.), a new subulate Melanea, and various other fresh-water shells. It also occurs in a similar clay, and accompanied by the same shells, from Hampstead Cliff to Cowes, and among the fresh-water series on the opposite Cliffs of Hampshire, as we learn by specimens collected by the Rev. Professor Sedgwick and Charles Lyell, jun. Esq. It is also sparingly found at Headon Hill.

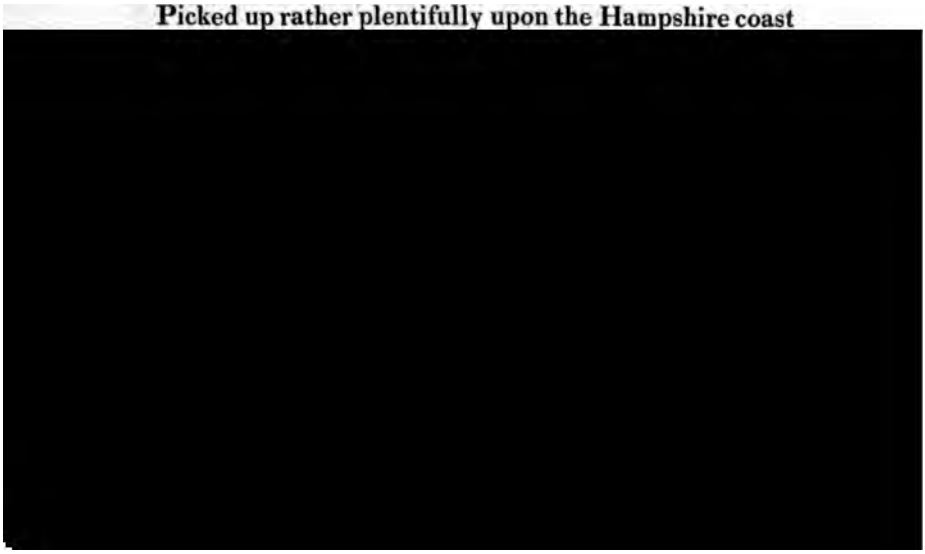
MELANOPSIS brevis.

TAB. DXXIII.—*fig.* 2.

SPEC. CHAR. Ovate, pointed, short; whorls ventricose, contracted in their upper parts; aperture oval; inner lip thick; callus not very prominent.

MUCH resembling several species of Buccinum: the convexity of its volutions is peculiar for a Melanopsis. Its width is about two-thirds its length; the inner lip is of nearly an equal thickness throughout, affording a strong contrast to the species above described.

Picked up rather plentifully upon the Hampshire coast



SOLARIUM canaliculatum.

TAB. DXXIV.—*fig.* 1.

SPEC. CHAR. Convex, ornamented on both sides with granulated unequal lines; edge prominent, crenated; umbilicus furrowed and crenated within; aperture round.

SYN. Turbo. *Brunder, figs.* 7 & 8.
Solarium canaliculatum. *Lamarck, Env. de Paris,* 104. *Lam. Hist. Nat.* 7. *p.* 5.
Trochus canaliculatus. *Brocchi, vol.* 2. 359.

THERE are three very distinct varieties of this Solarium. The English one, with only a few granulated ridges on the upper side, and the margin slightly prominent but relieved by a furrow on each side of it. The French variety, which has one prominent row of granules and many very minute rows on the upper side, the margin much produced and very finely crenated. And the Italian variety, of which the upper surface is beautifully ornamented with many rows of conspicuous granules; the margin very much produced, deflected, solid; and so sharply crenated as to be almost dentated. In this variety the crenulations within the umbilicus are also very sharp and pointed.—The actual aperture is round in all the varieties, and the characters above mentioned are liable to some variation.

Very abundant in the Clay at Barton Cliff.

SOLARIUM plicatum.

TAB. DXXIV.—*fig.* 2.

SPEC. CHAR. Convex, wrinkled, concentrically sulcated; umbilicus bounded by a more or less projecting crenated ridge; aperture round.

SYN. Solarium plicatum. *Lamarck, Env. de Paris,* 104. *Hist. Nat. v. 7. p.* 5.

THE sulci that cross the wrinkled surface of this shell are very narrow and deep upon the upper surface, but broader and unequal beneath; they vary in number, but are generally 3 or 4 above, and 5 or 6 beneath: the crenulated keel that projects into the umbilicus, sometimes half closes it, at others it leaves it more open, es-

FUSUS alveolatus.

TAB. DXXV.—*fig.* 1.

SPEC. CHAR. Turreted; volutions ornamented with two spiral obtuse carinæ, crossed by thick ribs; beak half cylindrical, ribbed.

THREE rows of nearly square pits or cells are formed upon each whorl by the crossing of the carinæ and ribs; the last whorl exhibits several more carinæ, which gradually diminish in size as they proceed upon the beak: aperture round, with an elongation into the beak.

Found in the Suffolk Crag by Mrs. Cobbold and the Rev. G. R. Leathes: it is very scarce.

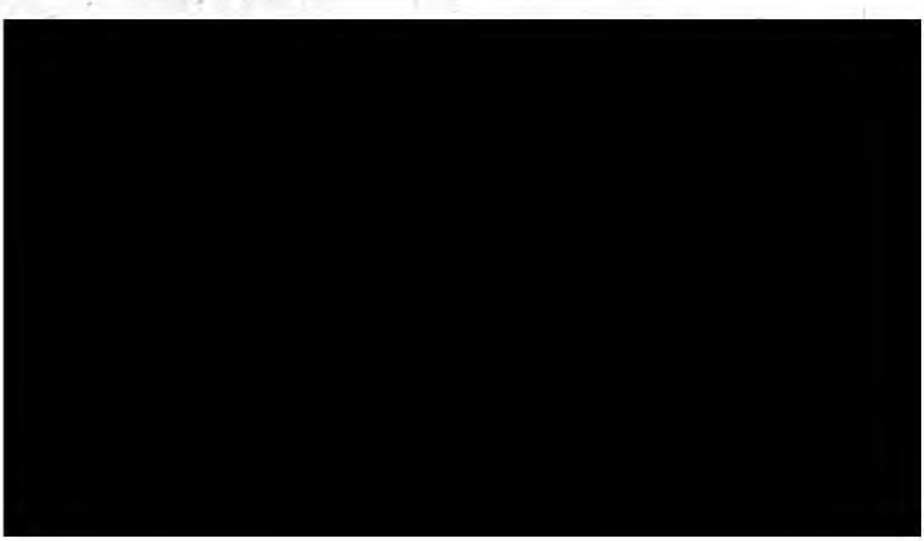
FUSUS cancellatus.

TAB. DXXV.—*fig.* 2.

SPEC. CHAR. Lanceolate, acute, covered with acute decussating ridges, with short spines at the points of their intersection; volutions ventricose; aperture oblong, produced into a short beak.

FOUR or five spiral rows of cells appear upon each whorl, bounded by sharp divisions and short spines at their angles; the spire is nearly twice as long as the aperture, which is rather contracted at its upper part.

From the very rich cabinet of Suffolk and Norfolk Crag fossils, from which the Rev. G. R. Leathes has long and liberally supplied us.



GASTROCHÆNA Spengler.

GEN. CHAR. An inequilateral equivalved bivalve, with the anterior margin obliquely truncated and gaping; the hinge-line straight, without a tooth, inclosed in a shelly sheath.

THE animal to which the shell above described belongs, perforates calcareous stones, corals or shells, by some solvent power, most probably not by wearing or scraping a hole, as Pholas and Teredo do; and lines the hollows more or less completely with shelly matter; or it forms itself a sheath of the same substance in sand or other loose or soft materials, some of which it unites to its fabric for its protection, as it is only in part covered by the two valves, which moreover are very slender. This sheath or case is commonly ovate, and of such a size and form as to hold the valves easily, with the posterior part so produced into a tube as to contain the two united tubes of the animal, its extremity being flattened and partially

divided by two opposite ridges, so as to fit very close when the animal is distended, and prevent the introduction of foreign substances. A tube very similar is formed by the Teredo, and some Lithodomi deposit calcareous earth about the openings of their cells, apparently for the same purpose. The two valves of the shell are thin, obliquely elongated, with the beaks near the anterior extremity; the oblique truncation of the anterior margin leaves a large space between the edges of the valves for the passage of the foot: the posterior portion is large, oval, and its edges towards the back more or less gaping.

We are indebted to the accurate observer Spengler, for the establishment of this very natural genus; and if Bruguière had never proposed the genus Fistulana, Conchologists would not have had to encounter the mass of confusion created by Lamarck, but have found good places for all the shells he has crowded into it, by the adoption only of Gastrochæna, in addition to the genera before formed. The genus Fistulana, as given by La-

he would lay aside, substituting Fistulana for it, notwithstanding Spengler's priority and acknowledged accurate definition. To this plan we cannot subscribe.

GASTROCHÆNA tortuosa.

TAB. DXXVI.—*fig.* 1.

SPEC. CHAR. Obliquely lanceolate, twisted.

THE longest diameter is four times the united depths of the two valves, or above three times the length; the hinge line is straight, the remainder of the shell twisted almost one turn: the sinus in the edge for the passage of the foot is elongated, acute towards the front; the whole surface nearly smooth.

Occurs in a dark brown clayey sandstone much stained with iron, in the Cliffs of Robin-Hood's Bay, near Scarborough. The specimen is in the collection of Mr. Bean of that place: it consists of one valve placed upon the surface of the stone, without any indication of the tube that once inclosed it.

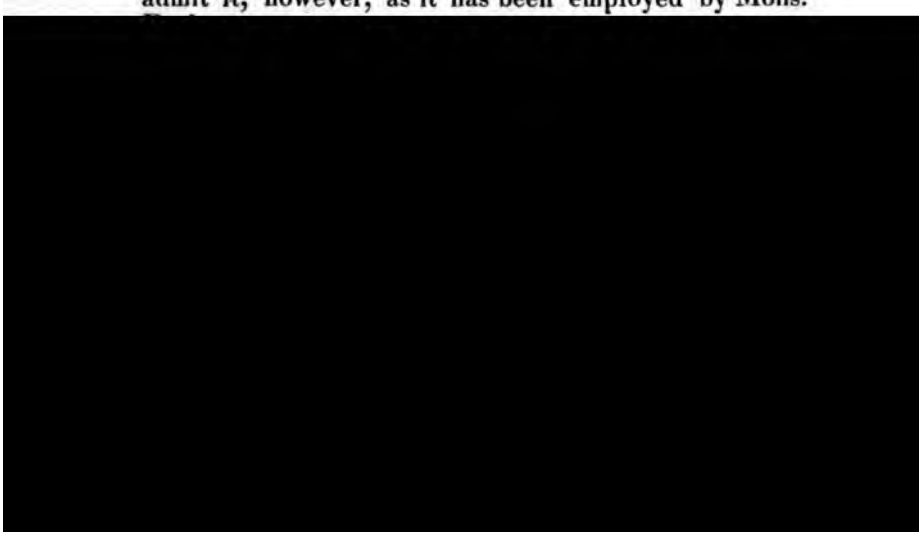
GASTROCHÆNA contorta.

TAB. DXXVI.—*fig.* 2.

SPEC. CHAR. Sheath clavate, bent nearly at a right angle: valves ovate-elongated, marked with very slender striæ; the sinus between them wide, oval, pointed.

SYN. Fistulana contorta. *Deshayes Cocquilles Fossiles, v.* 1. *p.* 16. *pl.* 1. *fig.* 24, 25, & 27. *Mém. de la Société d'Hist. Nat. v.* 1. *pt.* 2. *p.* 251. *n.* 3. *pl.* 15. *f.* 4.

THIS species exhibits all the characters of the genus, forming a sheath that is more or less imbedded in other shells; and the aperture of which, produced and often bent, is partially divided by two opposite ridges: the general form of the valves, especially the width of their anterior extremities, and the fine striæ upon their surface, distinguish it from other species. The form of the sheath depends so much upon its situation, that it is not safe to lay any stress upon it as a specific character: we admit it, however, as it has been employed by Mons.



CYCLAS pulcher.

TAB. DXXVII.—*fig.* 1.

SPEC. CHAR. Suborbicular, convex, smooth, slender; posteriorly truncated; one sharp-edged and two bifid teeth near the beaks in each valve; lateral teeth plain, obtuse.

A THIN shell in proportion to its size, which much exceeds that of any other British species; the angular form of its posterior portion is a conspicuous character.

This species belongs to Lamarck's Genus Cyrena; but as we have much doubt of that being a natural division, we do not at present adopt it.

A discovery, for which we are indebted to the unwearied research of Professor Sedgwick, who found it in abundance on the shore opposite Hampstead Cliff, Isle of Wight, at low water, in a stiff clay, accompanied by a small Cyclas, a striated Mytilus, Potamides ventricosus, (t. 341. f. 1.) Melanopsis carinatus, several small univalves, and a Serpula,—all together forming a curious mixture of apparently marine and fresh-water shells.

CYCLAS medius.

TAB. DXXVII.—*fig.* 2.

SPEC. CHAR. Transversely obovate, depressed, thick, smooth; anterior side small; posterior rather pointed; one tooth near the beaks in each valve.

SYN. Cyrena media. *Annals of Phil. New Series, vol.* 8. *p.* 376, 378, 379.

INTERMEDIATE between Cyclas obovatus and C. cuneiformis, (tab. 162.) being flatter and thinner than the first,

but thicker and less pointed than the last: the hinge also appears to differ, as I have only been able to detect one central tooth in each valve; but the clayey stone is so hard, that it is difficult to clear the hinge.

This fossil occurs in various parts of the Weald Clay and Hastings Sands, both in Sussex and on the Isle of Wight. See Dr. Fitton's paper in the Annals of Philosophy above quoted. The specimen figured consists of indurated clay, and was collected at Chart.

CYCLAS membranaceus.

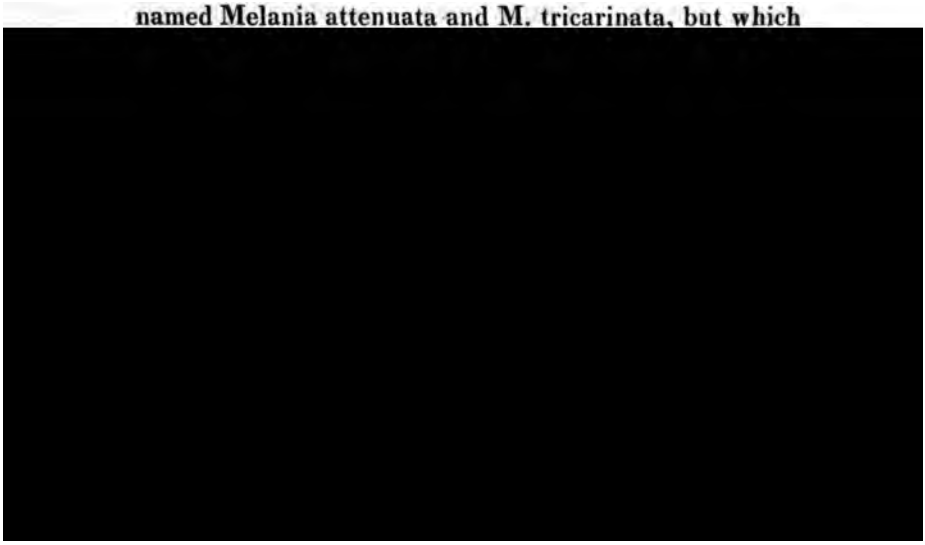
TAB DXXVII.—*fig.* 3.

SPEC. CHAR. Transversely obovate, depressed, smooth, very thin; anterior side small, posterior rather pointed.

SYN. Cyrena membranacea. *Annals of Philosophy, Second Series, vol.* 8. *p.* 376.

VERY much resembling the last, but it is extremely thin.

Occurs in slaty clay, accompanied by two other bivalves and two univalves, which for the present are named Melania attenuata and M. tricarinata, but which



LIMNEA maxima.

TAB. DXXVIII.—*fig.* 1.

SPEC. CHAR. Ovate-elongated, rather obtuse; whorls about 6, slightly convex; aperture narrow, occupying less than half the length of the shell.

READILY distinguished by the bluntness of its outline and the large proportion which the spire bears to the whole shell. The columella appears to be thin.

The Rev. Professor Sedgwick was so fortunate as to discover this large species of Limnea in the Stone Quarries at Binstead near Ride, in the Isle of Wight, this spring (1826). The specimens have lost almost all the exterior crust of the shell, the interior only adhering to the cast.

LIMNEA columellaris.

TAB. DXXVIII.—*fig.* 2.

SPEC. CHAR. Ovate-pointed; spire short; whorls about 5, convex; aperture wide, above half the length of the shell; columella much twisted and very thick.

NO other Limnea has so remarkable a columella: it is further distinguishable from most other species by the roundness of the whorls and shortness of the spire.

Collected in the Hordwell Cliff by Charles Lyell, Esq. during a careful examination of the Freshwater Strata there,—the valuable results of which we expect shortly to see published; it is accompanied by Planorbis rotundatus of Brongniart.

LIMNEA pyramidalis.

TAB. DXXVIII.—*fig.* 3.

SPEC. CHAR. Ovate-acute; whorls convex; aperture half as long as the shell, dilated; columella plait (or callus) obscurely divided.

SYN. Lymnæa pyramidalis. *Brard, Ann. du Mus. tom.* 15. *pl.* 24. *f.* 1 & 2. *Deshayes, tom.* 2, 95. *pl.* 10. *f.* 14 & 15.

A DEGREE of symmetrical elegance in the form of this species is perceived at first sight: it arises from the slight convexity of the whorls, the pyramidal form of the spire, and the proportions of its parts. The plait, or rather callus, upon the columella has a shallow furrow in the middle, but it is not very conspicuous.

Occurs at Headon Hill in the Isle of Wight. Our specimens agree well with Mons. Deshayes's figures

NAUTILUS excavatus.

TAB. DXXIX.—*fig.* 1.

SPEC. CHAR. Nearly globose, smooth; sides excavated by a very large conical umbilicus.

THE whorls of this Nautilus increase very rapidly: they are so wide that they would produce a spherical form, were it not for the large umbilicus which occupies nearly half the diameter of the shell. The front of the aperture is arched; the sides straight, converging towards the preceding whorl; the siphuncle nearly central.

From the collection of the late Mr. G. Humphries; most probably from Dorsetshire. It seems to have been taken from the Inferior Oolite.

NAUTILUS hexagonus.

TAB. DXXIX.—*fig.* 2.

SPEC. CHAR. Short cylindrical; sides depressed, conical; front broad, straight; umbilicus small; aperture sagittate, truncated; siphuncle nearest the inner edge of the septum.

IN this species the septa are rather numerous and not much curved: its most remarkable character is the straightness of the lines that bound a section of it in the plane of the aperture, which section being an elongated hexagon has suggested the name.

Far from rare in the Calciferous Grit at Shotover, Abingdon, &c.—the specimen figured was from the former place. It is in the cabinet of H. H. Goodhall, Esq. Sometimes the shell is decayed, when the casts of the cells become loose, and may be separated like those of Ammonites Catena, tab. 420, along with which they are found.

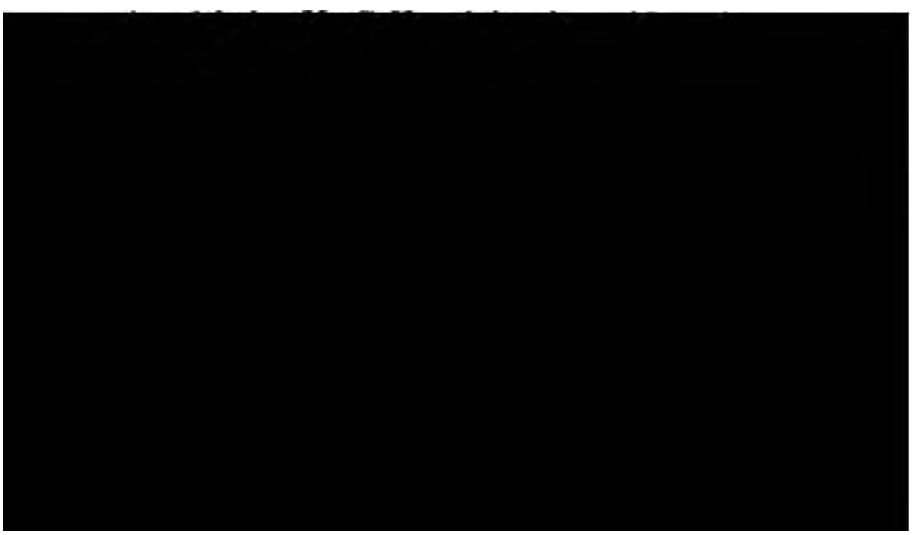
NAUTILUS polygonalis.

TAB. DXXX.

SPEC. CHAR. Sphæroidal, compressed, smooth; columella prominent; umbilicus very small; aperture arcuate, above half the diameter of the shell, long; septa distant; siphuncle near the outer edge of the septum, composed of a number of straight tubes.

THE thickness of this is about two-thirds of its diameter: it has a large aperture, the reflected extremities of which nearly close the umbilicus; the septa are distant, very concave, and but slightly curved at their edges; the siphuncle consists of a number of straight tubes, each projecting a little behind the septum it pierces to join the preceding tube. The whole series appears to be disjointed; the polygon formed by it in the section has suggested the specific name.

Probably from Dorsetshire. The only specimens we have met with were in the immense and various collec-



MYA? angustata.

TAB. DXXXI.—*fig.* 1.

SPEC. CHAR. Valves unequal; transversely elongated, thin, antiquated, irregularly compressed; extremities obtuse, gaping; lower edge of the lesser (right) valve concave.

Two or even sometimes three times as wide as long, uneven, and sometimes curved; the umbones are much nearest to the anterior extremity; they are small, and not eroded: the hinge resembles those of Myæ plana and subangulata, tab. 76; but that it belongs to the same genus as the Mya labiosa is doubtful.

Newly discovered by Professor Sedgwick in Colville Bay, Isle of Wight, along with Mytili, Ostreæ, and some shells sometimes referred to fresh water, in a bed of Sand and Clay evidently belonging to that mixture generally called the Upper Marine Formation.

MYA Pullus.

TAB. DXXXI.—*fig. 2.*

SPEC. CHAR. Transversely ovate and striated, compressed; anterior side largest; posterior side rather pointed.

A SMALL slender shell about half as wide as long; it is strongly marked by lines of growth, and therefore appears to be a full-grown shell.

Drawn from a specimen found in Crag at Butley, in Suffolk, and which is in the late Mrs. Cobbold's collection. It is said to be the only one met with. It is possible it may be the young of M. arenaria tab. 364; but the difference of form and the roughness of its surface militate against that idea.

MYTILUS affinis.

TAB. DXXXII.—*fig.* 1.

SPEC. CHAR. Obliquely oblong, carinated, smooth; sides parallel, straight; the posterior arched in the young shell; hinge without teeth, its anterior margin reflected.

VERY similar in shape and proportion to the common Mussel, or rather M. pellucidus, but more decidedly carinated; the extremity of the hinge within the beaks is reflected, and has no appearance of teeth; the posterior surface is not quite flat, but is convex near the beaks, a little approaching the genus Modiola. It differs in the same way from M. Antiquorum (tab. 275.), as it does from M. pellucidus;—it is remarkably pearly.

Found in Colville Bay, Isle of Wight, by Professor Sedgwick, along with Mya angustata, Potamides ventricosus, &c. in Sand and Sandy Clay.

MYTILUS Brardii.

TAB. DXXXII.—*fig.* 2.

SPEC. CHAR. Convex, straight, pear-shaped, elongated; beaks acute, terminal (within each beak a plate is extended to the opposite edge for the support of a tendon, and within that is a flat angular process).

SYN. Mytilus Brardii. *Faujas, Ann. du Mus.* 8. *t.* 58. *f.* 11 & 12? *Brongn. Ter. du Vicentin.* 78. *t.* 6. *f.* 14?* *Basterot, Mem. de la Soc. d'Hist. Nat.* 2. *Part* 1, 78.

A RATHER variable shell, its surface being generally convex with an approach to keel-shaped near the pointed beaks. Specimens from Dax are often sharply keeled for nearly half their length, and the rest is antiquated. The plate which extends across the cavity within each beak, bears a small muscular impression, analogous to that upon the surface near the beak in most other Mussels. The only other species that has a similar support for the attachment of the smaller muscle or tendon, whichever it may be, is the Freshwater one, M. polymorphus, found in the Danube and most of the rivers

plate above mentioned, but quite detached from it. The second species so nearly resembles the fossil, that we can point out no difference; they are both liable to the same variations of form, are of the same size, and both possess within the hinge the same kind of flat angular process; a process that is attached in part to the line that supports the hinge cartilage, and in part to the before-mentioned plate, from which it descends obliquely into the cavity of the valve. This appendage is regular and constant, and therefore should appear to be connected with the form of the animal; whereas the second septum in M. polymorphus, does not always occur; and when it does, it is irregular and seems to be the effect of disease or over-luxuriant growth.

This very interesting shell is abundant at Dax and Mérignac, and probably in several other parts of the Continent: but it was reserved for Charles Lyell, Esq. jun. to discover it in England. He found it in the extensive bed of White Sand connected with the Lower Freshwater (or rather perhaps the so called Upper Marine) Formation, in the Hordwell Cliff. It is accompanied by Mya plana (tab. 76.) in profusion, a Potamides like margaritaceus (tab. 339. f. 4.) a little Melanea? (Bulimus conicus? Brard), and, what is most curious, a small Serpula. We have therefore either a mixture of Marine and Freshwater shells in a bed hitherto thought by us to contain only Freshwater ones, or we are mistaken in drawing conclusions from analogy without sufficient examination. The Mya plana certainly resembles the Mya labiosa (a recent Freshwater species) more than it does any known Marine one: but it is slenderer, and the beaks are not eroded as in most Freshwater shells. The Potamides is an ambiguous genus. What we call a Melanea, and which Brard has referred to Bulimus, greatly resembles some species of Phasianella. The marks of distinction are small; as we are ignorant of the operculum, or if it ever had one. The Mytilus resembles more closely the African species, than that from the Danube; but the African species may be washed from the rivers down to the coast, or, like that from the Danube and the Wolga, it may be capable of living in

both fresh and salt water. All these shells still leave us, therefore, in doubt. But what does the Serpula prove? No Serpula is known to live in fresh water, and the one we have along with these Mussels is too tender to have been removed far; so if the other shells belong to fresh water, they must have been brought down by a river into the sea; but they are extremely well preserved, and many as tender as the Serpula, which makes us rather incline to the opinion that they are all Marine, at least those which occur in the same stratum.

That river shells should be washed down to the coast and mix with marine ones is probable: even large masses or islands, consisting of decayed vegetable matter with the shelly remains of animals that lived in lakes, may by floods be carried into rivers, and by them down to the sea, and be deposited upon the ordinary sediment in the bed of the ocean. The analogy of the various shells in the formations we allude to, rather favours this hypothesis. We leave it to geologists to compare a number of facts, respecting situation and many other circumstances, to determine the question.

ANCYLUS Müller.

GEN. CHAR. Shell slender, patelliform, obliquely conical; apex rather acute, turned back; aperture oval, with an entire edge.

A GENUS of small almost minute shells resembling Patella, but differing in the form and direction of the apex, which takes a position indicating an incipient spire, and is not turned forward as in Patella. The recent species have a membranous epidermis. The animal resembles that of Limnea, living in fresh water, and breathing air, and is consequently very different from that of Patella; it is attached to the shell along an involute line open on one side.

Two recent species and two fossil ones are all that have hitherto been published. We now add a third fossil, which, although small, illustrates the genus well, and is consequently a valuable acquisition.

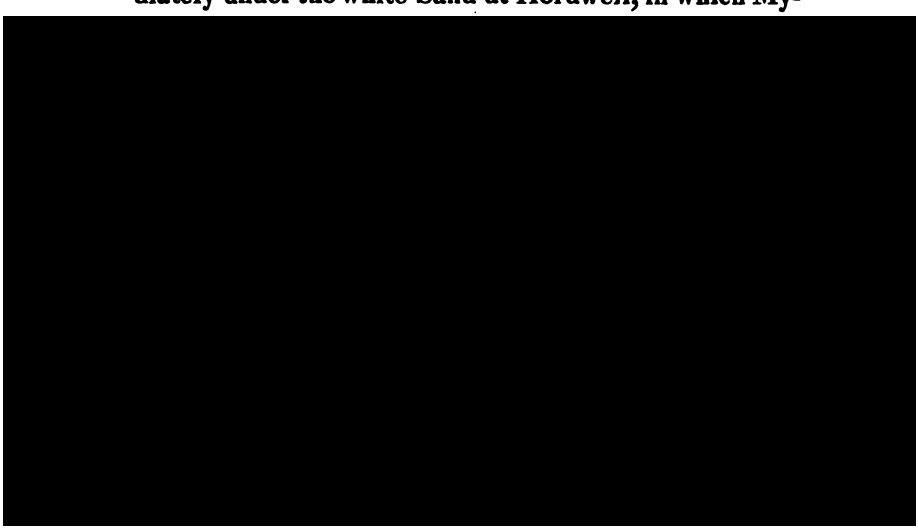
ANCYLUS elegans.

TAB. DXXXIII.

SPEC. CHAR. Convex, subconical; aperture longitudinally obovate; apex oblique, eccentric, near the narrowest part of the aperture.

THE aperture is exactly intermediate in form between that of the two recent species. Considering the aperture as the base, it is narrowest towards the back: the apex is far from central, and is bent down towards one side. With a high power, minute striæ are seen descending from the apex; the height is nearly equal to half the greatest diameter of the aperture.

Found along with Mya subangulata (probably only a young state of M. plana), Melanopsis brevis, tab. 523, and Paludina lenta, tab. 31, in a dark gray Sand immediately under the white Sand at Hordwell, in which My-



LUTRARIA ? striata.

TAB. DXXXIV.—*fig.* 1.

SPEC. CHAR. Transversely oval, compressed, concentrically striated; posterior side smallest, rather pointed, gaping; umbones prominent.

A SMALL shell, about two-thirds as long as wide: the superior margin of the posterior side is rather produced and turned outwards; the surface is marked by numerous concentric striæ.

Found in the Greensand near Lyme Regis, by H. T. De la Beche, Esq., in whose cabinet the specimen is preserved. The shell is almost lost, only a film of powder remaining upon the surface of the cast.

This and the two following fossils are very similar to some recent species of the genus Anatina,—a genus with the limits of which we are not sufficiently acquainted to be able to arrange shells under it, without the help of the hinge, in the form of which the principal difference from Lutraria rests *.

* In many of the species, and perhaps in all, if the genus were confined within its proper limits, there is a loose appendage to the hinge.

LUTRARIA? carinifera.

TAB. DXXXIV.—*fig.* 2.

SPEC. CHAR. Transversely oval, elongated, convex, longitudinally striated; posterior side smooth, bounded by an obtuse carina, truncated, its edge straight.

ABOUT twice as wide as long: the surface is largely undulated; the longitudinal striæ do not cover much more than the anterior half of the valves, and even there are lost near the edge.

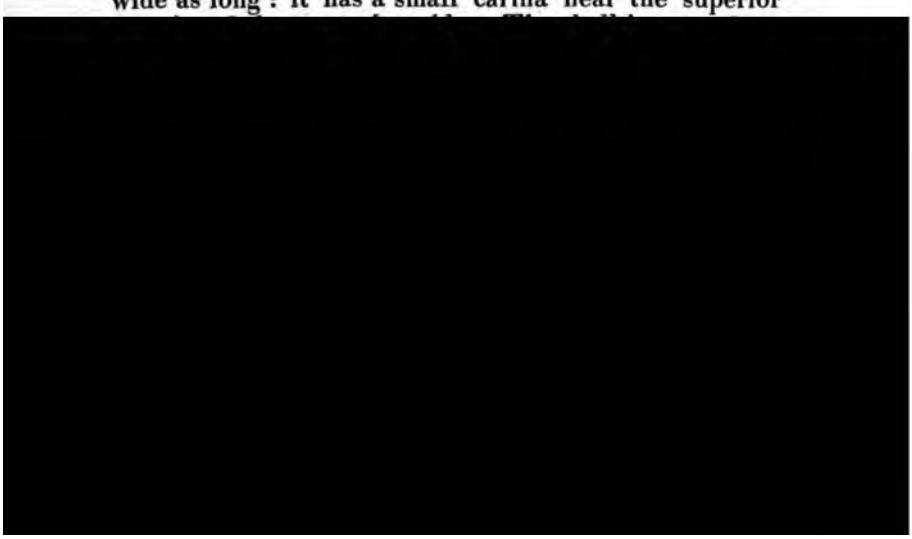
A curious shell, the produce of the Lower Chalk at Dowlands. Drawn from a specimen in the cabinet of H. T. De la Beche, Esq.

LUTRARIA? oblata.

TAB. DXXXIV.—*fig.* 3.

SPEC. CHAR. Compressed, transversely oval, with obtuse extremities slightly bent; umbones prominent.

A SMOOTH but rather antiquated shell, nearly twice as wide as long: it has a small carina near the superior



TEREBRATULA Flabellula.

TAB. DXXXV.—*fig.* 1.

SPEC. CHAR. Depressed, plaited; plaits about 16, simple, rounded; lesser valve transversely obovate; larger valve with a straight rectangular projecting beak.

A SMALL species, with only a triangular aperture to the beak: the front is even; that is, no part of its margin is elevated.

From the Ancliffe Oolite.

TEREBRATULA furcata.

TAB. DXXXV.—*fig.* 2.

SPEC. CHAR. Nearly orbicular, plaited; plaits rounded, about 9, forked when full-grown; the larger valve most convex, its beak large, curved.

ABOUT the same size as the last. When young, the plaits are simple and the sides angular: when old, the plaits are forked and the sides round; the front is even, the beak has a circular aperture.

Common at Ancliffe.

TEREBRATULA orbicularis.

TAB. DXXXV.—*fig.* 3.

SPEC. CHAR. Uniformly convex, plaited; plaits angular, simple, about 15; lesser valve orbicular, the other with a large curved beak.

ALTHOUGH at first sight the plaits upon this shell appear simple, yet they are sometimes forked near their commencement: it is therefore possible that the species last described may be only the young of this.

From the Lias at Weston near Bath. The surface is minutely punctated.

TEREBRATULA oblonga.

TAB. DXXXV.—*fig.* 4, 5 & 6.

SPEC. CHAR. Oblong, gibbose, plaited; plaits 16 or more, forked, their edges rounded; beaks large, broad, slightly incurved.

HALF as long again as wide: the hinge is rather broad.

TEREBRATULA hemisphærica.

TAB. DXXXVI.—*fig.* 1.

SPEC. CHAR. Hemisphærical with a produced incurved beak, longitudinally striated; striæ very numerous.

THE lesser valve of this is nearly flat; it is a little undulated: the striæ are in fact minute plaits, and give a finely toothed margin to the valves, which is otherwise even.

Found at Ancliffe. We are indebted to the cabinet of the Rev. G. Cookson for it.

TEREBRATULA rigida.

TAB. DXXXVI.—*fig.* 2.

SPEC. CHAR. Orbicular, plaited; plaits granulated, increasing in number towards the margin; lesser valve nearly flat, the other convex, with a small beak.

A WELL-DEFINED species, with an even front and small circular aperture in the beak.

Only one specimen of this little shell has come within our observation: it was found in the Chalk near Norwich.

TEREBRATULA striatula.

TAB. DXXXVI.—*figs.* 3, 4 & 5.

SPEC. CHAR. Imperfectly bilobate, compressed, longitudinally ovate and striated; front truncated, sometimes with a sinus; striæ granulated, repeatedly forked.

SYN. Terebratula striatula. *Mantell, Geol. Sussex, p.* 131. *tab.* 25. *figs.* 7, 8, & 12.

BOTH valves of this Terebratula have generally a longitudinal depression near the front, although some spe-

cimens do not possess it in the smaller valve; the beak of the other valve is large but short, its circular aperture reaches to the beak of the small valve; the front is even. The length varies so much, that some specimens are nearly orbicular.

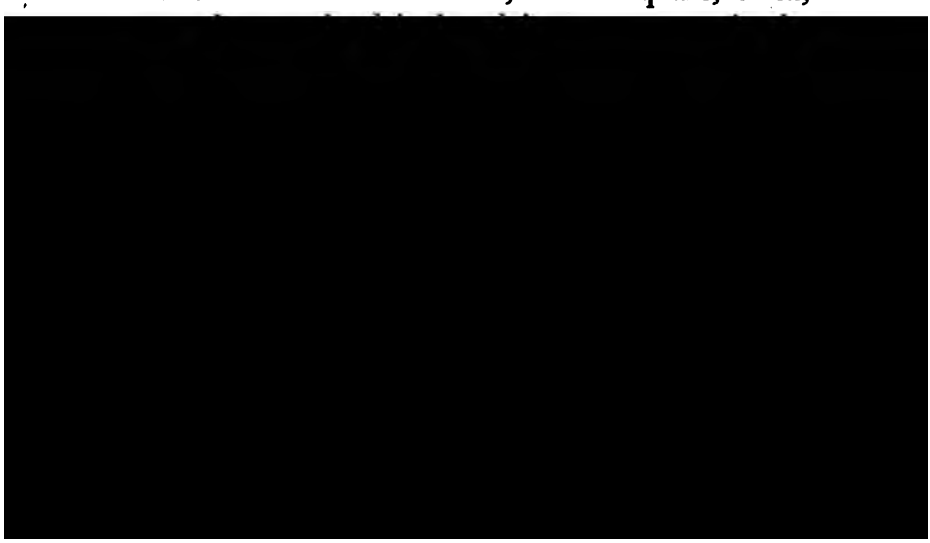
Frequent in the Chalk. Mr. Mantell obtained his specimens from the gray Chalk Marl at Hamsey. Although they are larger than those before us, we see no reason for thinking them distinct. It occurs also in the Greensand below, and in the Clay above, the Chalk. We have a small specimen from Horningsham; and numerous pyritous casts of both the long and short varieties, some with the shell remaining, from Southend and the Isle of Sheppy on the opposite shore, through the kindness of the Rev. Mr. G. Hope, and Mr. Frembly. It also occurs at Dax, as we are taught by specimens given us by Dr. Grateloup, who has named it T. aquensis.

Figs. 3 & 4. represent the long variety taken out of Chalk in Sussex. Fig. 5. shows the short variety:—one specimen is out of Chalk, the other is a cast in Pyrites from Southend.

TEREBRATULA Pisum.

TAB. DXXXVI.—*figs.* 6 & 7.

SPEC. CHAR. Suborbicular, rather square, thick,



TEREBRATULA rostrata.

TAB. DXXXVII.—*figs.* 1 & 2.

SPEC. CHAR. Suborbicular, gibbose, plaited; plaits many, rounded; beak large produced, slightly incurved, pointed; front slightly elevated.

UNTIL nearly full-grown the elevation of the front in this species is scarcely perceptible, and then it is not very regular. The inner surface of the beak is more convex than is common; the plaits amount to nearly 30.

Sent from Sussex many years ago by G. A. Mantell, Esq. probably found in the same marl-pit, at Hamsey, as the T. Pisum. Fig. 2. exhibits a distorted specimen.

TEREBRATULA truncata.

TAB. DXXXVII.—*fig.* 3.

SPEC. CHAR. Semicircular, plaited; plaits sharp, from 9 to 20, some of them forked; front elevated with from 1 to 5 plaits; hinge line straight, equal to the width of the shell; lesser valve nearly flat, the other subconical with a large straight beak which is flat in the front.

A LARGE round aperture in the beak and an extended hinge line give this fossil a peculiar truncate appearance; and, together with the large often antiquated plaits, render it easily distinguishable. Were it not for the aperture in the beak and the internal structure, which is fortunately well preserved, it might be taken for a Spirifer.

Hitherto only found at Farringdon. The specimens are furnished by H. H. Goodhall, Esq. and Gerrard E. Smith, Esq., two gentlemen who derive much gratification from the pursuit of Fossil Shells:—to the former, geologists have long and frequently been indebted.

TEREBRATULA Gibbsiana.

TAB. DXXXVII.—*fig.* 4.

SPEC. CHAR. Suborbicular, rather triangular, ventricose, plaited plaits numerous, rounded, simple; front much elevated with about 10 or 12 plaits, flattened; beak small, incurved, pointed; small valve most convex.

THE length and breadth of this are equal without including the beak; it is therefore a much longer shell than T. lata, tab. 502, which it greatly resembles.

Found in Greensand near Folkstone, in 1813, by Mr. Gibbs, an ingenious veteran collector well known to conchologists a few years back.

TEREBRATULA Mantelliana.

TAB. DXXXVII.—*fig.* 5.

SPEC. CHAR. Transversely obovate, gibbose.

NUMMULARIA.

Nummulites, Lamarck.

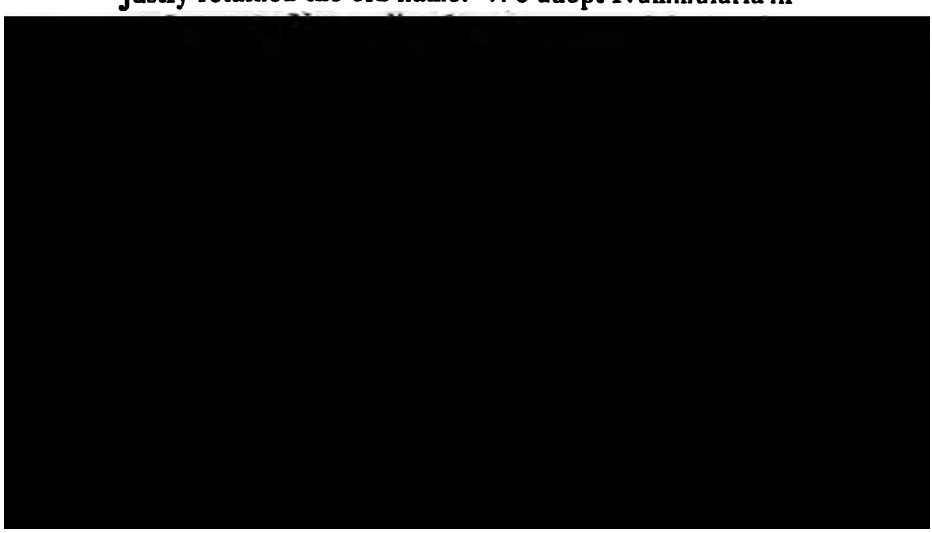
Gen. Char. A lenticular, involute, chambered, univalved shell, with similar sides; whorls closely embracing each other and penetrated by small columns; septa convex near their fronts, leaving a fissure between each of them and the front of the preceding whorl; their sides narrow, variously curved, extending to the axis.

Notwithstanding the introduction of several distinctions not noticed by Lamarck, and other modifications of the generic character for the purpose of accuracy and of distinguishing Nummulites from other exuviæ of supposed Cephalopodous Mollusca, we have not been able to exclude Lamarck's genus Lenticulites, the species of which only differ in general form or trivial characters from Nummulites: in fact, the two characters which Lamarck points out to distinguish the Lenticulites by, both exist in Nummulites, but have been overlooked: the small fissure between the edge of each septum and the margin of the preceding whorl has not before been noticed; it occurs both in the Nummulites and Lenticulites of Lamarck, and so do the small columns that penetrate from one side to the other parallel to the axis, and sometimes form protuberances upon the surface. The whorls appear to be completed at various periods of growth by three or four chambers gradually diminishing from the centre, until the last extends only to the

edge of the preceding whorl, and this chamber, being closed by a convex septum without any continuing margin, is not readily distinguishable in species which have very small chambers in proportion to their diameter, as most of the established Nummulites have: this and the ordinary imperfection of the specimens have together misled Authors; it is a character easily traced in Lenticulites planulata.

The Nummulariæ are supposed to belong to the same division of the Order Cephalopoda as Nautilus, Spirula, &c. It is considered, with much probability, that they were enveloped entirely by their animals, because they have no large chamber for their lodgement. Several if not all the genera of minute chambered shells have probably been similarly situated, and agree also in the want of the siphuncle and in having convex septa. Hence they will form a natural group, near to, but distinct from, Nautilus, Belemnites, &c.

Nummulites were by the ancients thought to be petrified lentils. A species found in Egypt near some of the pyramids is so spoken of by Strabo. Several species are apparently united by Gmelin under the genus Nautilus, with the specific name Helicites (page 3371), which is given to them by Guettard. Bruguières named the genus Camerina (Encl. Méthodique); but Lamarck has justly retained the old name. We adopt Nummularia in



NUMMULARIA lævigata.

TAB. DXXXVIII.—*fig.* 1.

SPEC. CHAR. Lenticular, smooth, rather convex on both sides; edge narrow; whorls about 12.

SYN. Nummulites lævigata. *Lam. Env. de Paris,* 172. *Hist. Nat.* 7. 629. *Parkinson, Org. Rem.* 3. 152 & 158. *tab.* 10. *f.* 13 & 14. *Mantell, Geol. of Sussex, p.* 269.

THE volutions in this species are very much compressed laterally; they amount to about 12: the surface is smooth, except a few rising punctums where the columns that penetrate it, or a harder substance than the rest of the shell, terminate; the sides are most convex in the centre, and are besides irregularly a little waved; the edge is blunt, and finely striated; the shell is composed of perpendicular fibres with a semitransparent coat both within and externally; when partially filled with spar, the fissure at the inner edge of the septum is not easily distinguishable.

J. Holloway, Esq. first discovered this fossil in England, and forwarded specimens from Stubbington Cliff to Mr. Parkinson. The same gentleman soon afterwards met with it in Bricklesom Bay, Sussex, and very liberally supplied the specimens that have served for this illustration. It has also been found in various parts of the Continent.

A section of one of the chambers,—to show the fissure behind the septum, the texture of the shell, and the striated margin,—is shown magnified.

NUMMULARIA elegans.

TAB. DXXXVIII.—*fig.* 2.

SPEC. CHAR. Compressed, smooth; whorls about 6; septa gently curved from the axis, numerous; aperture rather prominent.

THIS differs from the last in being smaller, in having fewer whorls, which increase more rapidly, and in the regular curvature of the septa. When young, it is very smooth and regularly lenticular. The large figure shows several series of diminishing chambers, as mentioned in the observations upon the genus.

A siliceous stone occurs at Emsworth, near Chichester, that contains among other shells an abundance of these Nummulites filled also with silex; the other shells are too imperfect to ascertain in our specimens.

It is an intermediate species between Lenticulina and Nummulites of Lamarck.

NUMMULARIA variolaria.

TAB. DXXXVIII.—*fig.* 3.

SPEC. CHAR. Very convex, minute, smooth; edge obtuse, whorls 4 or 5, with about 20 septa * forming rays near the margin.

SYN. Lenticulites variolaria. *Lam. Env. de Paris,* 168. *Hist. Nat.* 7. 619.

AMMONITES Benettianus.

TAB. DXXXIX.

SPEC. CHAR. Subglobose, with two rows of 20 large tubercles around the front, and one row composed of half the number upon each side; whorls few, crossed by large obtuse radii that connect the tubercles, the inner ones partly exposed; aperture transversely oblong.

NINE or ten large conical tubercles compose the row on each side, while double that number fill the other two rows; the transverse rays are more conspicuous as well as more numerous between the rows of knobs than upon the inner sides of the whorls, and are quite lost upon the narrow space over the siphunculus. In the very young shell the aperture is round, and the tubercles are not formed; as it advances in growth the aperture becomes wider, and the tubercles rise from the ribs and are soon very prominent, those upon the sides being always the largest: the tubercles are conical, obtuse, not at all approaching to cylindrical as in A. proboscideus t. 310; it is also a larger shell.

Found among Clay, mixed with green-sand, that is used for making tiles at Crockerton, near Warminster. The shell remains much decomposed and very soft, filled with hard black marl mixed with Pyrites. It was accompanied by Am. Monile t. 117, Am. dentatus t. 308, and fossil wood penetrated by Teredines. The shells are in the same state as similar ones found at Folkstone, where the same bed occurs; but the wood resembles that of Highgate: a species of Ampullaria also occurs in the same Clay, similar to an unnamed one found cast in silex at Blackdown.

For the knowledge and use of the specimens of this Ammonite we are indebted to the zeal of Miss Etheldred Benett, whose labours in the pursuit of geological information have been as useful as they have been incessant.

AMMONITES denarius.

TAB. DXL.—*fig.* 1.

SPEC. CHAR. Discoid with a flat edge, a row of about 10 tubercles on each side, and thirty curved radii abruptly terminating near the front; whorls few, partly exposed; aperture oblong.

A RATHER compressed shell: the tubercles are conical, obtuse; each of them is joined to two rays, and there is generally a third ray between each; none of the rays extend past the tubercles towards the centre; they are all nearly equal, and a very little enlarged just before they terminate upon the front.

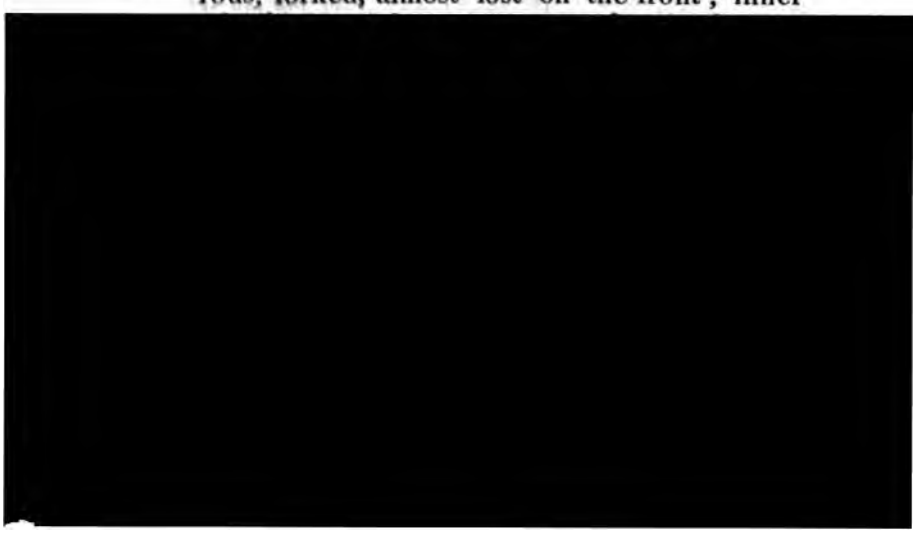
Distinguished from A. lautus, tuberculatus, and several of the same division of the genus, by the blunt and low termination of the rays upon the front, and several minor characters. In the young state the aperture is longer than wide, and the tubercles only a little elevated.

Found on Blackdown, by H. H. Goodhall, Esq., in whose cabinet the larger specimen is preserved. The shell is cast in silex.

AMMONITES spinosus.

TAB. DXL.—*fig.* 2.

SPEC. CHAR. Discoid, radiated; whorls few, furnished, when young, with four rows of strong spines, which disappear by age; radii numerous, forked, almost lost on the front; inner



PECTEN obsoletus.

TAB. DXLI.

SPEC. CHAR. Equivalved; ears very unequal; surface finely striated, striæ obliquely diverging. Ostrea obsoleta et O. lævis. *Maton and Racket, Trans. Linn. Soc.* 7. 100.

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var. α. *glabra;* surface plain, sometime sulcated near the edge; rarely marked with 4 or 5 ribs. *Figs.* 1, 2, 3, 4.

var. β. *sulcata:* with many radiating sulci or deep striæ, surface often elevated in 4 or 5 broad ribs. *Figs.* 5, 6, 7.

var. γ. *costata;* surface elevated with from 7 to 10 obscure ribs; either plain or sulcated. *Fig.* 8.

WE have here grouped together a number of shells whose common characters are an equality and slight convexity of the valves, very small posterior ears, and minute arched striæ diverging obliquely from an imaginary line drawn along the middle of each valve. We have divided them into three varieties; but the characters that have been selected to distinguish them are often so combined, that many more divisions might have been made,—a proof that they all belong to one species. The ears in all are alike strongly striated. Individuals of each variety occasionally occur with the margin for some breadth bent perpendicular to the surface (figs. 2, 3, 6 & 7): this circumstance is not so frequent; nor are the ribs, when they occur, so strongly marked in the recent as in the fossil subjects; otherwise there is not the shadow of a difference between them.

Found abundantly in the Crag of Norfolk and Suffolk, by Mrs. Cobbold, the Rev. G. R. Leathes, &c. To the latter friend I am obliged for the use of the extensive series that has displayed the varieties so completely.

This species resembles several upon plate 205; but they are a thicker shell, are more coarsely striated, and have larger posterior ears.

PECTEN annulatus.

TAB. DXLII.—*fig.* 1.

SPEC. CHAR. Orbicular, convex; numerous, thin, erect, concentric laminæ and fine longitudinal striæ ornament the surface, passing over the large ears.

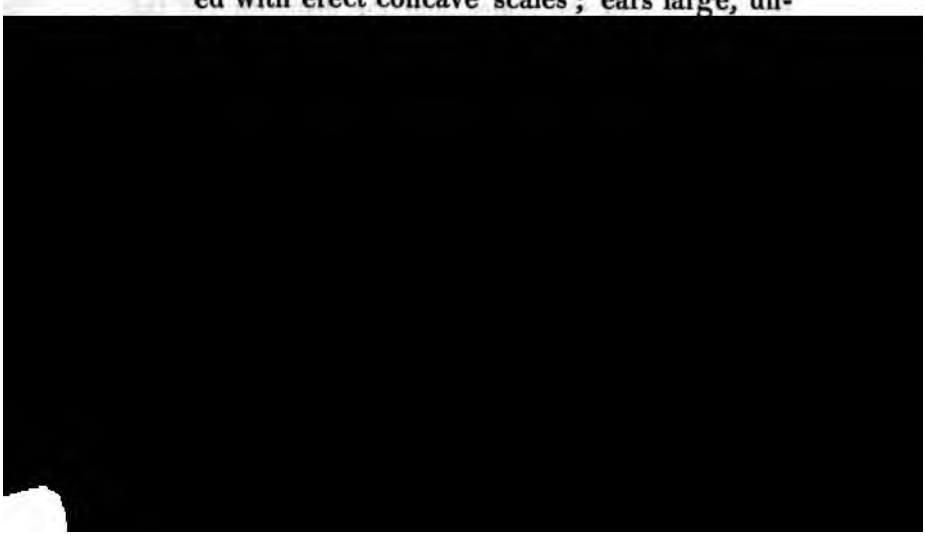
LENGTH about 2½ inches, which is rather more than the width; the concentric laminæ are about a line apart. Except that it is much less gibbose, it strongly resembles P. cinctus t. 371.

Communicated by the Rev. T. O. Marsh, who collected it out of the Cornbrash Limestone at Felmersham. The anterior ear is probably reduced in size by fracture, as it is much injured.

PECTEN Princeps.

TAB. DXLII.—*fig.* 2.

SPEC. CHAR. Orbicular, compressed; decorated with 90 rounded nearly equal radii surmounted with erect concave scales; ears large, un-



PECTEN vimineus.

TAB. DXLIII.—*figs.* 1 & 2.

SPEC. CHAR. Convex, rather longer than wide, concentrically striated; ribs about 20, prominent, closely beset with thick elevated scales, which are less numerous upon the left valve; ears nearly equal.

SYN. P. varius. *Geol. Survey of the Yorkshire Coast, p.* 233. *t.* 9. *fig.* 9. *excl. Syn.*

A FEW of the ribs are obscurely tripartite towards the edge, the rest are very round and (especially upon the left valve where they resemble rods of wire) much elevated. About 2 inches wide and 2½ long. It differs from the recent P. varius in the number and size of the ribs, the thickness of the scales, and the disposition of the striæ between the ribs. Some specimens have small ribs between the principal ones.

Plentiful in, and indeed characteristic of, the Oolitic Limestone of Malton. It also occurs at Ely, and in Gloucestershire.

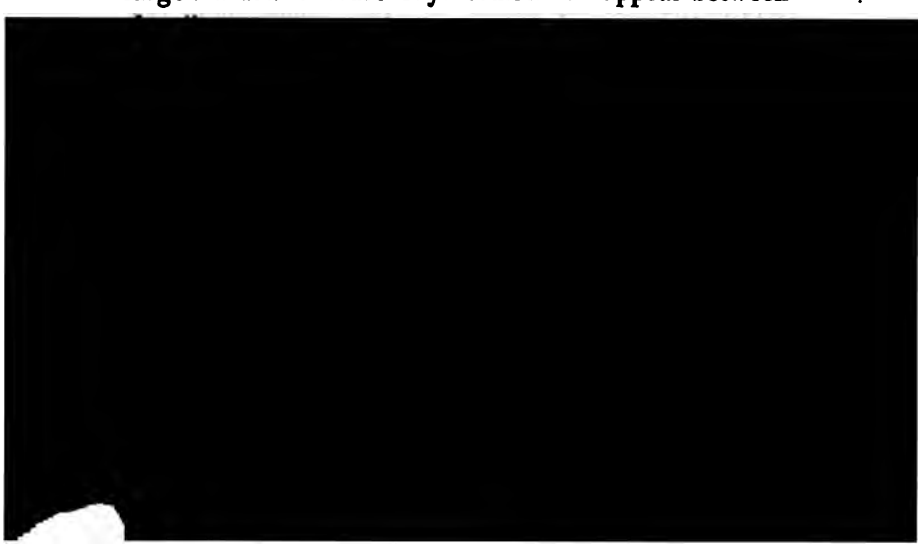
PECTEN vagans.

TAB. DXLIII.—*figs. 3, 4, & 5.*

SPEC. CHAR. Rather convex, a little longer than wide; ribs 11, large, convex, decorated with large erect concave scales that are very close upon the right but distant upon the left valve; ears nearly equal, crossed by large scales.

SYN. P. sulcatus. *Geol. Survey of the Yorkshire Coast, p. 233. t. 9. fig. 3. excl. Syn.*

SELDOM above an inch and a quarter wide. It differs from the last by having only half the number of ribs, and in not having the regular concentric striæ which appear between the ribs in that. When young the ribs are but a little raised, although the scales are then large: a few obscure rays sometimes appear between



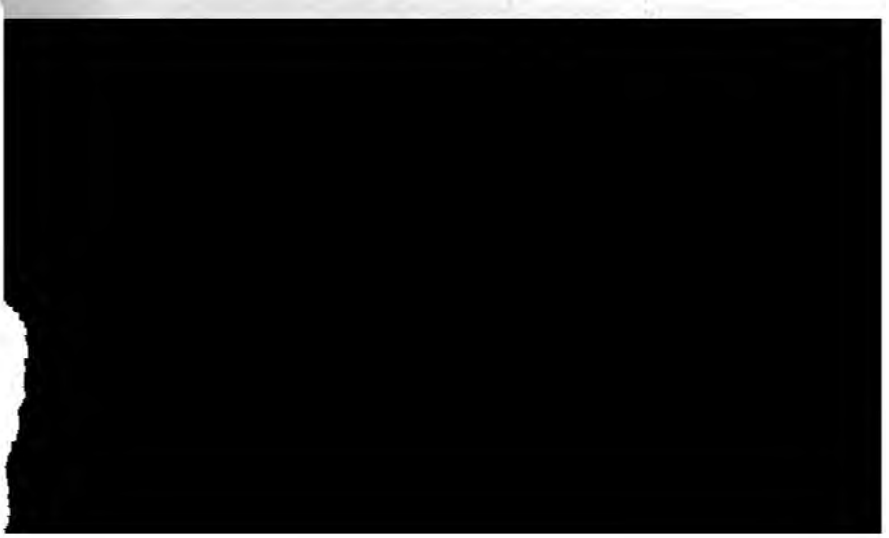
TRIGONIA spectabilis.

TAB. DXLIV.

SPEC. CHAR. Suborbicular, rather elongated, convex, nearly smooth, ornamented with about seven bent rows of large round tubercles upon the anterior side, and a few small ones scattered over the posterior side; one row of compressed tubercles upon the posterior slope.

BOTH the anterior and posterior slopes are straight, and meet in a right angle at the beak: there is a slight longitudinal rather square elevation of the surface, that divides it into two nearly equal parts; on one side of this the rows of partly connected tubercles end, on the other are the scattered small ones. This seems to be distinct from Trigonia nodosa t. 507. f. 1, as it is more completely covered with knobs and is of a shorter shape.

A very handsome cast in Silex imbedded in Sandstone, found at Blackdown. It is one of the many rare fossils that enrich the cabinet of H. H. Goodhall, Esq. It is so well displayed that I was delighted with the opportunity of figuring it, although the surface is so delicate that it has not been possible to do it justice.



PHOLADOMYA. *G. B. Sowerby.*

GEN. CHAR. A transverse thin subhyaline ventricose shell; the posterior portion short, rounded; the anterior more or less elongated and gaping: the hinge composed of an elongated subtrigonal foveola, and a marginal plate in each valve with a rather short external ligament; the muscular impressions two, indistinct; the sinus in the impression of the mantle large; the umbones approximated.

THE thin shells of this genus have generally several oblique ribs or rows of gentle elevations upon the surface, with corresponding hollows within. The inner surface is pearly.

Until the discovery of a recent species from the island of Tortola induced my brother to establish this extremely natural genus, the fossils belonging to it were scattered in various genera, to none of which they had any good claim to be united.

The following fossils, published in this work under other names, belong to the genus Pholadomya :

Cardita	producta	tab. 197, fig. 1.
	obtusa	ib. 2.
	lirata	ib. 3.
	deltoidea	ib. 4.
	margaritacea .	297.
Lutraria	lirata *	225.
	ovalis	226.
	ambigua	227.
	angustata	327.

* This name it is proposed to change for *fidicula*.

PHOLADOMYA Murchisoni.

TAB. DXLV.

SPEC. CHAR. Oval, with large beaks; the anterior side short; six or seven prominent, obtuse, knotted ribs ornament the middle.

A STRAIGHT shell, whose sides are smooth and free from ribs; the ribs near its anterior side are much the largest.

The present secretary of the Geological Society, Roderick Impey Murchison, Esq., influenced by a highly praiseworthy zeal for the advancement of geology, last summer (1826) visited the remote district of Brora in Sutherlandshire, where coal has been worked for some years. His valuable observations are presented to the Geological Society, and his collection of fossils, among which are several new ones, liberally offered for the use of "Mineral Conchology": no apology is therefore necessary for naming a shell after such a friend.

The shell before us is the same as was brought from Brora by Mr. Farey, and figured along with Pholadomya (Cardita) margaritacea upon t. 297, at fig. 4: but more perfect specimens have enabled us to define the species, although they are often much and variously compressed.

Brought by Mr. Murchison from Brora, along with several new fossil shells hereafter to be figured, and the exact position of which will be described by him in the Paper (now in preparation for the Geological Society) upon the Brora Coal Field and other contemporaneous formations in the north of Scotland.

Fig. 1 & 2. from the roof of the coal.

Fig. 3. is from a ledge of rocks opposite the Old Salt Pans.

PHOLADOMYA acuticostata.

TAB. DXLVI.—*figs.* 1 & 2.

Spec. Char. Oval-elongated; with four or five large keel-shaped ribs upon the very short anterior side, and many gradually lessening ones over the middle of the shell.

Well distinguished even when much broken, by the large sharp ribs upon the anterior extremity. It is the smallest species we know of, the nearest like it is P. angustata, t. 327.

Brought from Brora by our valued and much-to-be-lamented friend, John Farey, sen. Esq. along with the last species. It occurs in the stratum immediately upon the coal.

Fig. 2. is from an impression in the limestone slate of Stonesfield, and seems to belong to the same species.

PHOLADOMYA æqualis.

TAB. DXLVI.—*fig.* 3.

GRYPHÆA Maccullochii.

TAB. DXLVII.—*figs.* 1, 2, & 3.

SPEC. CHAR. Obovate, oblique, gibbose; beak produced, much incurved; posterior lobe more or less distinct; the front rather angular.

INTERMEDIATE between Gryphæa dilatata, t. 149. and G. incurva, t. 112; it also bears some resemblance to G. bullata, t. 368. in its young state; but as it is much shorter than the first, so it is longer than either of the latter, and much thicker than the last in all stages of growth. The division of its surface into two lobes is very variable.

Collected in Pabba, Scalpa, Carsaig in Mull, and several other places, by R. I. Murchison, Esq. and named by him after the eminent geologist Dr. Macculloch, who first noticed the beds in which this fossil is contained. See a Description of the Western Islands, vol. i. pages 296, 320, and 562.—It is much to be regretted that the fossils there mentioned are not more fully described, especially since two species of Gryphite are alluded to.

This Gryphæa is also found in England, and belongs probably to the Lyas beds; but I have only met with specimens from Braunston in Northamptonshire, where they were found, in what is called a gravel-pit, by Miss Baker, from whose collection figs. 1. and 2. are drawn.

Fig. 3. represents a small one from Pabba.

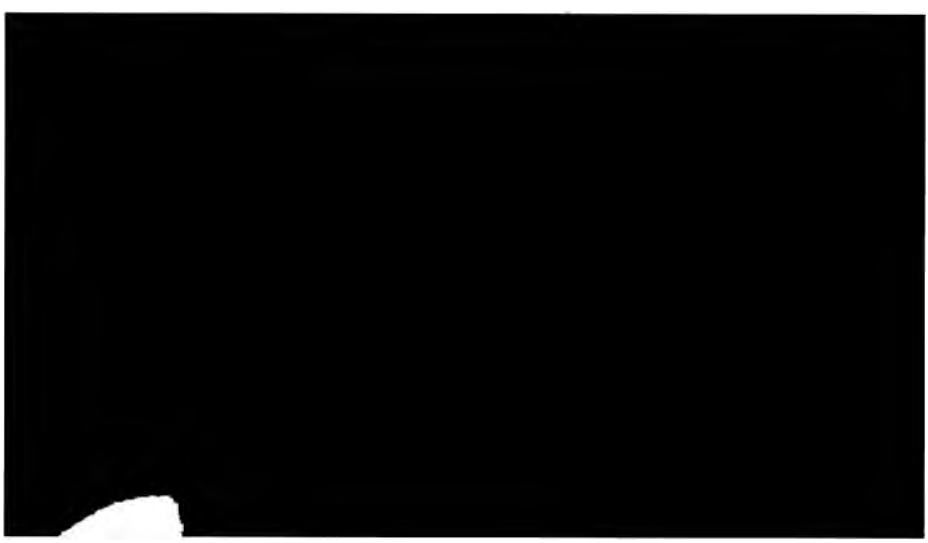
GRYPHÆA minuta.

TAB. DXLVII.—*fig. 4.*

SPEC. CHAR. Orbicular, gibbose; beak spiral; lobe obscure.

A MINUTE species with a thin shell and closely pressed and much curved beak.

Found, rather rarely, among numerous other minute fossils, at Ancliffe, by the Rev. Geo. Cookson.



SANGUINOLARIA undulata.

TAB. DXLVIII.—*figs.* I & 2.

SPEC. CHAR. Three times as wide as long, transversely undulated, convex; anteriorly rounded, posteriorly subtruncate, gaping a little; fulcra prominent.

A SHELL in general form much resembling some species of the Linnæan genus Mya; but its great width and the external situation of the ligament, pointed out by the fulcra, indicate an approach to the Linnæan genus Solen, of which Sanguinolaria is a portion.

The undulations of its surface are peculiar; they gradually disappear upon the posterior portion: the shell is thin and smooth, internally a little pearly.

One of the most remarkable fossils collected by R. I. Murchison, Esq. in the district of Brora. It occurs in the peculiar bed that forms the roof of the coal, consisting of argillaceous limestone of a soft texture and gray colour in the pits where coal is now worked (fig. 1.), but hard and of a red-brown in the rocks opposite the Old Salt Pans (fig. 2.). The fossils that accompany this will be fully detailed in Mr. Murchison's forthcoming Paper.

SANGUINOLARIA gibbosa.

TAB. DXLVIII.—*fig.* 3.

SPEC. CHAR. Three times as wide as long, gibbose, smooth; sides rather acuminated, a little gaping.

A THIN smooth unio-like shell, which from some slight resemblance to the last is placed provisionally in the same genus.

Occurs in the mountain Limestone of Queen's County, Ireland.

AMMONITES lævigatus.

TAB. DXLIX.—*fig.* 1.

SPEC. CHAR. Discoid, smooth; inner whorls nearly concealed; margin obtuse; aperture very narrow.

ONE of the very few Ammonites that have no rays nor undulations upon the surface. The edge is so round as to form a much elongated oval aperture, which is rendered sagittate by the deep impression of the preceding whorl; the volutions are few, and expand rapidly.

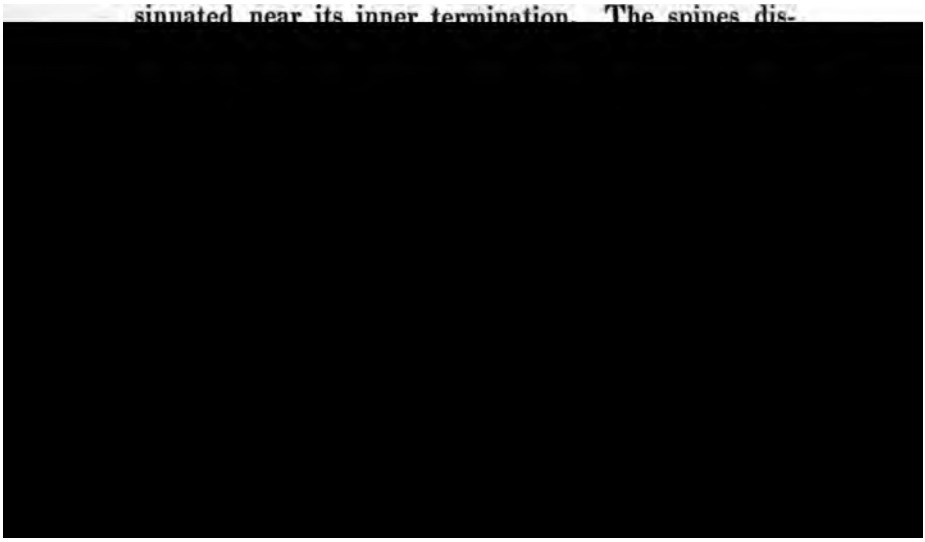
Found along with A. Benettianus, and several other fossils similar to those that occur in the marl at Folkstone, at Crockerton near Warminster, by Miss E. Benett, whose magnificent collection of fossils it helps to enrich. We are also indebted to Dr. Fitton for specimens found at Cheriton near Sandgate, Kent, in clay used for making tiles. They are casts in pyrites.

AMMONITES Gowerianus.

TAB. DXLIX.—*fig.* 2.

SPEC. CHAR. Compressed, radiated, with a spine upon each ray where it divides into three or four; front rounded; whorls convex, the inner ones half exposed, showing the row of spines; aperture nearly orbicular.

THE radii upon this beautiful shell commence close to the inner edge of the whorl: they are numerous, prominent and sharp over almost half the side, there each is generally furnished with a large sharp spine, at the base of which it divides into three or more, prominent, obtuse, ring-shaped ridges that pass over the rounded front; the length of the aperture occupies nearly one-third of the diameter of the disk. Its edge, which we have observed in only one specimen, is thin and gently sinuated near its inner termination. The spines dis-



AMMONITES Murchisonæ.

TAB. DL.

SPEC. CHAR. Discoid, carinated, when young radiated; whorls flattened, their inner edges obliquely truncated, the front rounded; the inner whorls partly exposed; radii obtuse waved, usually forked, not passing on to the front.

ONE of the many Ammonites that lose the rays or undulations as they increase in size; and in which the innermost whorls, or those that probably existed in the egg, are also smooth: the radii are curved, irregular in their degree of elevation, and continue until the shell is about two inches in diameter, after which the whorls are almost suddenly plain, or only marked by lines of growth; the truncature of the inner margin of the whorl produces a concave surface; the form of the aperture is half an ellipsis, its sides are slightly projecting lobes; the keel is very slightly prominent; it contains, as usual, the siphuncle, which is strongly marked by the dark colour of the spar by which it is replaced.

Broken out of a calcareous nodule composed of compacted Ammonites and other fossils, at the base of a cliff

of micaceous sandstone east of Holme, near Portree, Isle of Skye, by Mrs. Murchison, after whom I have named it, as a just tribute for the ardour with which she has pursued the study of Fossil Conchology, the pleasing effects of which those who are so happy as to be acquainted with her know how to appreciate.

TURBO Tiara.

TAB. DLI.—*fig.* 1.

SPEC. CHAR. Short, conical; whorls few, flattened upon the sides, crowned by large, rather obliquely elongated elevations; base convex, umbilicated.

A large handsome shell, whose characters are remarkable and easily defined: the elevations around the spire are about twenty upon each whorl, the very young shell is free from them.

Produced by the Mountain Limestone near Preston. The specimens are borrowed from the collection of Mr. Gilbertson.

TURBO obtusus.

TAB. DLI.—*fig.* 2.

SPEC. CHAR. Short, conical, obtuse, transversely striated; sides straight; base convex; striæ numerous.

A regularly conical shell, with a solid convex base and rounded edge. The striæ exceed twelve upon each whorl; they are crossed by fine lines of growth.

Found at Ancliffe, seldom so large as the specimen figured.

CARDIUM decussatum.

TAB. DLII.—*fig.* 1.

SPEC. CHAR. Cordiform, antiquated, longitudinally ribbed; anterior margin rounded; posterior side a broad area raised in the middle; length and breadth nearly equal.

SYN. Cardium? decussatum. *Mantell, Geol. Suss. p.* 126. *t.* 25. *f.* 3.

THE form of the posterior side of this Cardium is precisely like that of C. cardissa; the keel, however, by which it is bounded is obtuse; the anterior side is much more prominent; it is conical with a rounded margin. The beaks are elegantly incurved.

For this rare production of the Chalk Marl we are indebted to the intelligent author of the Geology of Sussex: the specimen is from a pit at Hamsey; the one figured by our friend was found at Brighton. When the anterior side is viewed, a general resemblance is observable to the genus Pholadomya; but the posterior side is so exactly similar in form to the heart-shaped cockles, that, in the absence of all knowledge of the hinge, we follow Mr. Mantell in referring this species to Cardium, along with the hibernicum.

CARDIUM alæforme.

TAB. DLII.—*fig.* 2.

SPEC. CHAR. Triangular, ventricose, longitudinally ribbed; anterior side truncated, produced near the hinge, concentrically ribbed; posterior side much produced, compressed, ribbed.

THIS approaches much to Cardium hibernicum in general aspect; but it has no sharp keel, and the anterior side is strongly ribbed. The posterior side is so produced as to form a kind of lobe, which improves the resemblance the outline has to a wing. The ribs upon the central part of the anterior side diverge from one of the longitudinal ribs on each margin of it; the ribs upon the other parts are very close, and alternately large and small; the cast has only the larger ribs.

The specimens figured are from Queen's County, Ireland: the same species has also been found at Scarlet on the Isle of Man, by Mr. Henslow; in both places in dark coloured fœtid Limestone.

CARDIUM hibernicum.

TAB. DLII.—*fig.* 3. and TAB. LXXXII.—

CARDIUM striatulum.

TAB. DLIII.—*fig.* 1.

SPEC. CHAR. Orbicular, convex, concentrically striated; posterior side longitudinally striated with a toothed edge.

STRONGLY resembling Cardium Hillanum, tab. 14, but it is more perfectly orbicular; the transverse striæ are less regular, and the longitudinal ones twice as numerous as the angular sulci which occupy a similar situation in the Hillanum.

This Cardium accompanies the Sanguinolaria undulata (tab. 548), &c. in the argillaceous and at the same time areniferous Limestone next above the coal at Brora, where it was collected by R. I. Murchison, Esq. in the reef opposite the Old Salt Pans (see the larger figure); the smaller figure is from a specimen preserved by Mr. Farey,—it is accompanied by another species.

CARDIUM dissimile.

TAB. DLIII.—*fig.* 2.

SPEC. CHAR. Transversely obovate, gibbose, smooth; posterior side bounded by a small rib, longitudinally striated; front rather straight.

A SMOOTH shell, so much resembling several species of Venus, that it has been referred to that genus: it is very thick every where except near the beaks: the length is a little less than the width.

Very frequent in the Portland Limestone. We have specimens from Portland, Purbeck, and Tisbury.

CARDIUM truncatum.

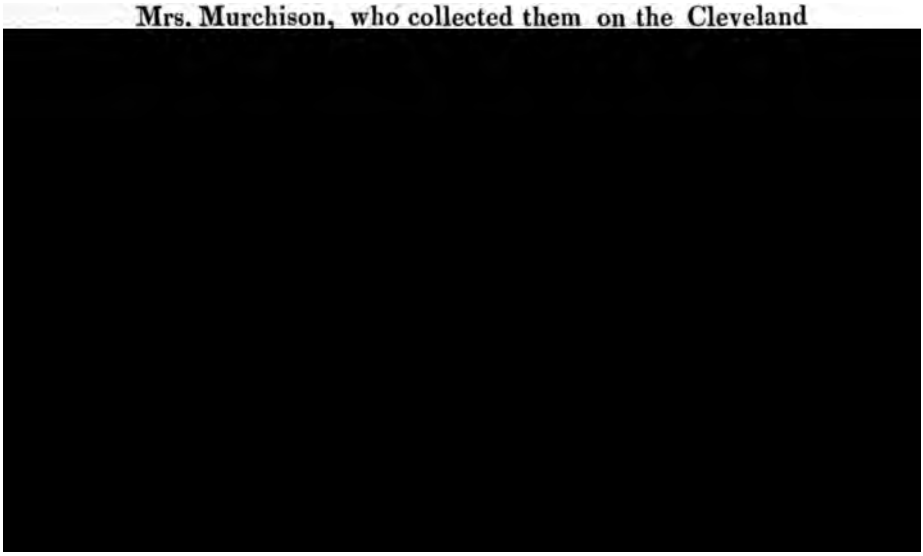
TAB. DLIII.—*fig.* 3.

SPEC. CHAR. Transversely ovate, gibbose, smooth; posterior side obliquely truncated, longitudinally sulcated; beaks small.

SYN. Cardium pectinatum, *Young and Bird*, 226. *pl.* 8. *f.* 5.

NEARLY as long as wide, most gibbose towards the beaks, the ridges between the sulci upon the posterior flattened side are scabrous.

Specimens of this remarkable shell have been supplied to us by S. Hailstone, Esq., who found them in a gray sandy Limestone, along with Terebratulæ, Pectens, and Aviculæ, at Roseberry Topping, Yorkshire: also by Mrs. Murchison, who collected them on the Cleveland



NUCULA deltoidea.

TAB. DLIV.—*fig.* 1.

SPEC. CHAR. Triangular, inflated; posterior side obliquely truncated, flat, pointed; anterior side short, rounded.

SYN. Nucula deltoidea, *Lamarck, Env. de Paris*, 194. *Hist. Nat.* vi. 60.

A PRETTY little shell, unlike any other species of Nucula: it is generally smooth, but is sometimes longitudinally striated, especially near the anterior margin.

Very abundant in some parts of the Clay of the so called upper marine formation on the Isle of Wight.

Specimens are sometimes found at Grignon half as wide as the larger figures, which are magnified.

NUCULA inflata.

TAB. DLIV.—*fig.* 2.

SPEC. CHAR. Nearly globular, smooth; the posterior side produced, compressed, pointed.

LARGE individuals of this shell are transversely oblong; the small ones heart-shaped or nearly globose; the produced side is small.

Found in Septaria in the London Clay at Highgate, in 1810. I have been favoured with casts in pyrites from Southend, by the Rev. F. W. Hope, who has made a very extensive collection at that place.

NUCULA undulata.

TAB. DLIV.—*fig.* 3.

SPEC. CHAR. Globular, concentrically undulated; posterior side produced, contracted, pointed.

MUCH resembling the last: its width is rather greater than its length, and it is a little oblique.

A cast in pyrites from the Clay at Folkstone. Its valves are equal, or it might be referred to Corbula.

NUCULA amygdaloides.

TAB. DLIV.—*fig.* 4.

SPEC. CHAR. Transversely elliptical, elongated and sulcated, compressed; sides equal.

AMMONITES Jamesoni.

TAB. DLV.—*fig.* 1.

SPEC. CHAR. Discoid, radiated; sides flattened; volutions 5 or 6; the inner ones exposed; radii large, simple, obtuse, equal to the spaces between them, bent towards the aperture as they pass over the front.

THE numerous large radii, considerably bent as they pass over the front, strongly characterize this shell; the aperture is nearly twice as long as wide.

Collected on the Isle of Mull, by R. I. Murchison, Esq., during a tour which has been the foundation of a valuable paper lately read before the Geological Society.

At the request of this gentleman I am happy to commemorate the celebrated Geologist whose name it bears, and who needs no panegyric from me. It has also been found in Robin Hood's Bay.

AMMONITES navicularis.

TAB. DLV.—*fig.* 2.

SPEC. CHAR. Umbilicated, costated; costæ large, numerous, annular, simple; whorls ventricose, very few; the inner ones half exposed; aperture transversely oblong.

SYN. Ammonites navicularis. *Mantell, Geol. of Sussex,* 198. *t.* 22. *f.* 5.

ABOUT three whorls, rapidly increasing, compose this Ammonite: all the costæ reach the edge of the umbilicus, half or more of them turn into it, and at the same time are rather enlarged; the costæ and the spaces between them are nearly equal.

From the lower Chalk at Guildford: presented to Mrs. Murchison by Mr. Mantell. It is only half the size of the one figured in the Geology of Sussex, where it is spoken of as a very rare shell.

AMMONITES latæcosta.

TAB. DLVI.—*fig.* 1.

SPEC. CHAR. Discoid, compressed, radiated; whorls 5, exposed; radii large, sharp, slightly waved, much flattened and widened as they pass over the rounded front; aperture oblong.

THE flattened sides of this Ammonite distinguish it from the young state of A. planicosta (tabs. 73 and 406), independently of its much larger size. When young, neither of them has any appearance of spines; when old, the last whorl of the latæcosta has only slight indications of tubercles, which consist of two small knots upon each ray on each side; the planicosta has one large spine in place of two, and that only upon some of the rays.

A Lyas fossil: all the specimens I have seen except one are from Alluvium; that one is from Lyme: it is about 3½ inches in diameter, and was liberally presented by Mrs. Murchison. One specimen nearly four inches in diameter shows the little knots upon the rays; it is in the collection of W. Peete, Esq. of Dartford. Several small ones have been found by Miss Baker at Braunston, in what is called a gravel-pit.

AMMONITES brevispina.

TAB. DLVI.—*fig.* 2.

LUCINA mitis.

TAB. DLVII.—*fig.* 1.

Spec. Char. Orbicular, convex, ornamented with minute, longitudinal striæ, and numerous small, regular, concentric laminæ; lunette oval, very concave; cardinal teeth obscure; no lateral tooth.

Lucina mitis, *Deshayes MSS.*

The concentric laminæ are beautifully regular, the spaces between them are crossed by minute irregular striæ: within, the surface is rough, but not marked with sunken puntums, as many of the genus are; it is in these two characters we conceive this species to differ from L. elegans (Deshayes, i. p. 101, t. 14, f. 10, 11.), of which we have no authentic specimen. Specimens of L. mitis, sent us by Mons. Deshayes, agree precisely with the shell before us.

Found abundantly in Barton Cliff by Miss Bemister.

LUCINA antiquata.

TAB. DLVII.—*fig.* 2.

SPEC. CHAR. orbicular, convex, ornamented with concentric laminæ; surface irregular; anterior side angular; lunette flat, lanceolate.

GENERALLY the laminæ are worn off the surface, and leave it irregularly furrowed; there are two teeth under the beaks, one of which is bifid, and one lateral tooth under the lunette; the shell is moderately thick.

I have not been able to refer this to any published species, although we possess many specimens from near Valognes, that accord precisely with the small unworn English ones. It approaches near to L. circinaria of Lamarck.

Occurs in Crag at Woodbridge, and other parts of Suffolk.

LUCINA crassa.

TAB. DLVII.—*fig.* 3.

SPEC. CHAR. Nearly orbicular, convex; covered with thick, slightly elevated, concentric lami-

ROSTELLARIA Pes-Pelicani.

TAB. DLVIII.—*fig.* I.

SPEC. CHAR. Turreted, striated; whorls angular in the middle and nodulose; last whorl three-keeled; the two upper keels divided into tubercles; lip expanded into three, pointed, diverging lobes; the canal at the base oblique, subfoliaceous.

SYN. Strombus Pes-Pelicani. *Linn. et Auct. Brocchi*, 2. 385.

Rostellaria Pes-Pelicani. *Parkinson's Organic Remains*, 3. 63. *Lamarck, Syst.* 7. 193. Var. meridionalis. *Basterot, Mém. de la Soc. d'Histoire Nat. de Paris*, 2. 69.

THE fossil shell now before us so precisely resembles the species well known as an inhabitant of the sea at the present day, that we can but consider them the same. Similar shells are found in the vicinity of Dax and in Placentia; but although they are referred to the same species, some differences may be observed which appear to be constant:—those found near Dax are smaller, and have more elongated but less prominent tubercles; those of Placentia have the angles upon the upper whorls, and

the keels upon the last whorl, as Mons. Brongniart has justly observed, either smooth without any tubercle, or only furnished with projecting points. It may be doubted whether these and the R. Pes-Carbonis of Brongniart (Terrains du Vicentin, p. 75.), which has no angles upon the upper whorls, but only elongated tubercles or costæ, are not varieties of the same species, depending upon locality. We find much difference among specimens of the recent type from different places.

In a clay-pit at Tottenhill near Lynn in Norfolk, are great numbers of this fossil, as we learnt several years ago from Mr. Wales of Downham. We have also been supplied with specimens by Mr. Rose of Swaffham, who finds Turbo Terebra (Linn.) with them. Specimens have been found in Suffolk, in Crag, by the Rev. G. R. Leathes, of which we have represented one, but not perfect enough to show the three lobes of the lip. May it not have been such a one that Parkinson found in the Essex Cliff, since he describes it as having but one spur-like process? or did he find the London Clay species?

ROSTELLARIA composita.

TAB. DLVIII.—*fig.* 2.

Spec. Char. Turreted, striated; spire costated; last whorl bicarinated; lip with but one, cuspidated lobe, besides the canal at its upper part.

A small species, distinguished by the costated spire and the broadly expanded lip with a spine where the upper keel terminates upon its edge.

We have seen but very imperfect individuals of this interesting shell. One (the upper figure), more strongly costated than the others, was picked up at Weymouth, in the Oxford Clay; others have been sent us from Scarborough: but the only ones that have the lip preserved (see the lower figure) were collected at Brora, in the stone immediately above the Coal, by our assiduous friend R. I. Murchison, Esq. It is an interesting species, because it proves that the genus occurs in a stratum older than the Greensand, at the same time that it helps to support the parallelism that may be traced between the fossil contents of the Greensand and Oxford Clay.

ROSTELLARIA Parkinsoni.

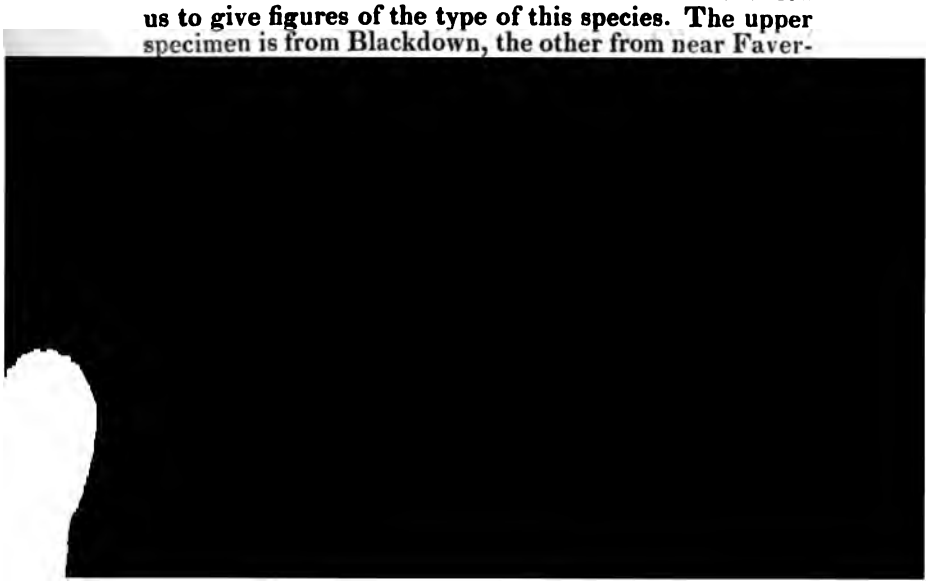
TAB. DLVIII.—*fig.* 3.

Spec. Char. Turreted, striated, costated; last whorl costated and obscurely carinated; lip expanded and furnished with one styloid process; costæ numerous.

Syn. Rostellaria, having only one spur-like process. *Parkinson, Org. Rem.* 3. 63. *tab.* 5. *f.* 11.
Rostellaria Parkinsoni. *Mantell, Geology of Sussex, p.* 72, 82, & 108.

The length of the costæ upon the last whorl, and the single spur-like process, are the essential characters of this shell. The former seems to distinguish it from the London Clay species given under the same name at tab. 349; but so great is their resemblance, that, with only imperfect specimens before us, we still remain in doubt.

The late sale of Mr. Parkinson's collection has enabled us to give figures of the type of this species. The upper specimen is from Blackdown, the other from near Faver-



PLAGIOSTOMA concentrica.

TAB. DLIX.—*fig.* 1.

SPEC. CHAR. Elliptical, oblique, convex, ornamented with many longitudinal striæ and a few regular concentric lines; hinge-line short; shell thin.

A NEATLY marked slender shell, whose greatest diameter is about double the least: it is most convex towards the beaks, which are but a little produced.

One of the many discoveries made by R. I. Murchison, Esq. in his late tour to the North of Scotland. It was found in a block of gray argillaceous Limestone, accompanied by Ammonites, upon the beach at Ethie, near Cromarty.

PLAGIOSTOMA elongata.

TAB. DLIX.—*fig.* 2.

SPEC. CHAR. Obliquely elliptical, convex, costated; costæ few, distinct, rounded; hinge-line short.

SYN. Plagiostoma. *Mantell, Geology of Sussex, p.* 129. *t.* 19. *f.* 1.

THE longest diameter of this Plagiostoma is equal to twice the shortest. The costæ are about fifteen or sixteen, prominent, rounded and smooth: they produce undulated margins to the valves.

An inhabitant of the Gray Chalk Marl and Upper Greensand. The upper figure is from a specimen found at Folkstone; the other from one presented in 1814 by Mr. Mantell, who obtained it at Hamsey.

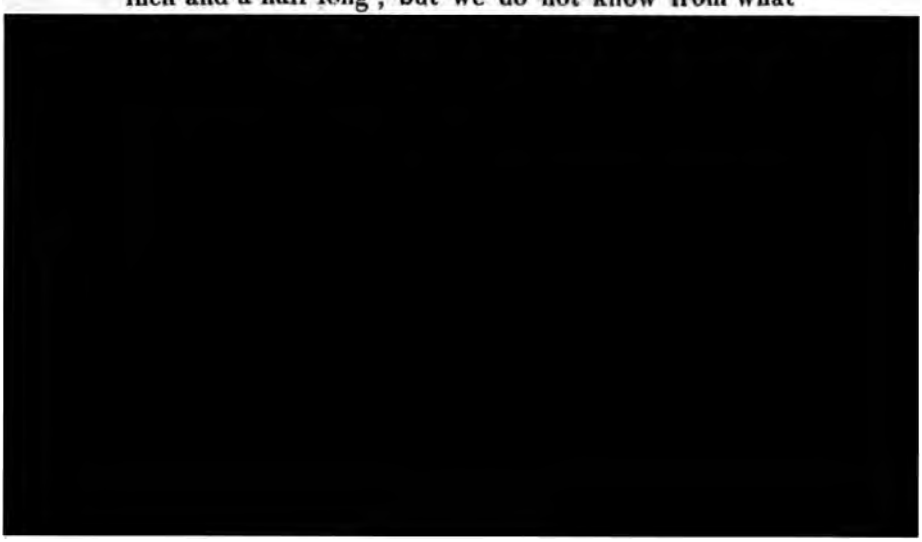
PLAGIOSTOMA duplicata.

TAB. DLIX.—*fig.* 3.

SPEC. CHAR. Obliquely obovate, convex, costated; costæ numerous, sharp; between each of the costæ is a sharp elevated line; beaks rather prominent.

THE costæ, which are sharp-edged, are about 25 in number: alternating with them is a set of much smaller but equally sharp elevations, which appear characteristic of the species.

The larger specimen is from the Oolite at Malton, the other apparently from Cornbrash; but the label has unfortunately been lost. We have a group with one an inch and a half long; but we do not know from what



PRODUCTA costata.

TAB. DLX.—*fig.* I.

SPEC. CHAR. Transversely oblong, with an angular depression in the middle, costated; costæ few, broad, decussated at their upper parts, compressed upon the deflected front; each side furnished with two or three spines and a small lobe.

STRONG sulci divide the surface of this shell into 18 broad ribs, which are crossed by concentric furrows upon the upper part of the convex valve: at each side is formed a small lobe, upon which are two or three spines: the front is much produced and deflected.

For the use of this strongly marked Producta we are indebted to Mrs. Murchison. It was found near Glasgow; and seems to have been imbedded in a shaley Limestone.

PRODUCTA calva.

TAB. DLX.—*figs.* 2 to 6.

SPEC. CHAR. Nearly square, smooth, flat or concave in the middle; beak much incurved; one row of spines on each side the hinge-line.

Var. α. Small, flat or slightly concave in the middle. *fig.* 2.

Var. β. Twice the size of var. α, with a canal along the middle. *figs.* 3—6.

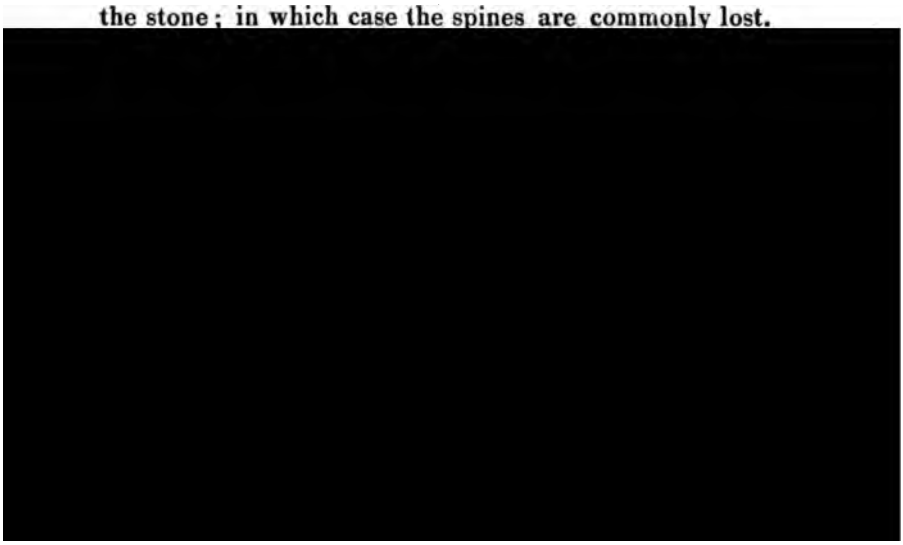
EXTERNALLY this species is remarkably smooth; but, like many others, it is scabrous within, or beset with

short spines. The surface of var. α is generally very flat in the middle; but some specimens are concave, and lead to the larger variety, from which they differ only in size. The spines upon each side the beak are in a single row, and few. It is difficult to detect them except in casts. Var. β much resembles P. horrida (t. 319. f. 1.).

Var. α (fig. 2.) was found some years back, and forwarded to us by Samuel Hailstone, Esq., at Nosterfield near Tanfield, north of Ripon, Yorkshire, in Magnesian Limestone, where Prof. Sedgwick has since observed it.

Var. β (figs. 3 and 4) are from a bed of compact gray Magnesian Limestone, immediately above a yellow Marl-slate, containing at least six species of fish, at East Thickley, near West Aukland, Durham; while the casts represented at figs. 5 and 6, are from the higher bed of yellow Magnesian Limestone of Humbleton Hill and other quarries near Sunderland, towards Durham.

In the series of figures given upon this plate, we have a complete illustration of the genus Producta. Figs. 1, 2, 3, and 4, exhibit various views of the outer surfaces of the two valves, as they appear when separated from the stone; in which case the spines are commonly lost.



PRODUCTA hemisphærica.

TAB. DLXI.

This plate represents some large specimens that were formerly referred to P. scotica: but upon an exact comparison, we find they do not agree with the figure in Mineral Conchology, tab. 69. f. 3; but that in fact half of the small specimen drawn at fig. 2. of the present plate was given upon tab. 328. to show a section of P. hemisphærica; to which species we see no reason why the large specimens should not be referred: and we consider the figures of them essential to illustrate it. The very narrow space between the valves is a useful character; the total want of spines distinguishes it from P. scotica. It is more difficult to distinguish from P. personata (tab. 321.), which is perhaps the internal cast of the same species, but seems rather more globose.

We have recently discovered, by purchasing the specimen it is taken from, that fig. 11. of tab. 12. of Parkinson's Organic Remains, which is called Trigonia rugosa (vol. iii. p. 177.), is taken from a large crushed individual of Producta scabricula (tab. 69. f. 1.).

SPIRIFER undulatus.

TAB. DLXII.—*fig.* 1.

SPEC. CHAR. Transversely elongated, very convex, with pointed extremities, radiated, transversely and deeply striated; front elevated, with a rounded sinus; radii obtuse, about 16 on each side the central elevation; beaks a little removed; area flat, narrow.

FULL twice as wide as long, nearly semicircular, with the sides produced as they approach the extremities of the hinge; the area between the beaks is narrow, with nearly parallel edges; the striæ upon the surface are regular, and waved by the obtuse radii, which scarcely rise enough to be called ribs; the central elevation is obtuse, and occupies the space of about four radii.

Presented by Professor Sedgwick, who collected it at East Thickley, along with Producta calva β (tab. 560.).

SPIRIFER octoplicatus.

TAB. DLXII.—*figs.* 2, 3, & 4.

SPEC. CHAR. Transversely elongated, gibbose, semicircular, plaited; plaits 8 or 10, deep and angular; central elevation plain; beaks remote, incurved; area triangular, curved.

A NEAT shell, strongly marked by the depth and small number of its plaits.

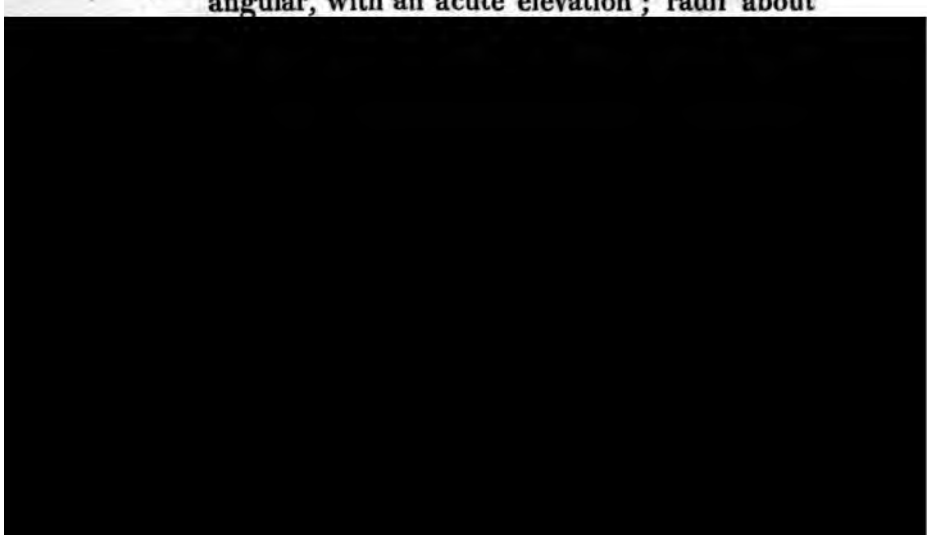
Collected in Derbyshire by the author of "Petrificata Derbyensia;" but it does not appear to be figured in that work.

Fig. 4. represents a larger specimen from the same place, with a striated or rather imbricated surface; but in other respects strongly resembling the small ones. May additional specimens prove it to be a distinct species?

SPIRIFER triangularis.

TAB. DLXII.—*figs.* 5 & 6.

SPEC. CHAR. Triangular, transversely elongated, convex, radiated; extremities acute; front angular, with an acute elevation; radii about



AMMONITES Sutherlandiæ.

TAB. DLXIII.

SPEC. CHAR. Discoid, gibbose, smooth; whorls two or three, partly exposed; umbilicus large and deep; aperture obovate, nearly circular.

SYN. A. Sutherlandiæ. *Murchison in Geol. Trans.* 2d Series, vol. ii. pt. ii. p. 323.

A PLAIN thick Ammonite with very few whorls, small portions only of the inner turns are seen within the wide umbilicus. The front is regularly rounded; the length of the aperture is nearly equal to half the diameter of the shell.

Discovered by R. I. Murchison, Esq. in the white Sandstone that composes the hills of Braambury in the district of Brora*, Sutherlandshire. It is named, at the request of Mr. Murchison, in compliment to the Marchioness of Stafford as Countess of Sutherland.

Fig. 1. represents a specimen that was found by the quarrymen after Mr. Murchison's visit to the district, and was reported to be a fossil human skull, whereon the Marquis of Stafford ordered it to be sent to London and presented to the Geological Society, in whose cabinet it now is. It is so compressed as to resemble a Scaphites; its diameter is double that of the figure.

Fig. 2. is from the first discovered specimen, and is two-thirds its diameter.

* For an account of this district see Mr. Murchison's very valuable and elaborate paper in the Geol. Trans. 2nd Series, vol. ii. part ii. p. 293.

AMMONITES cinctus.

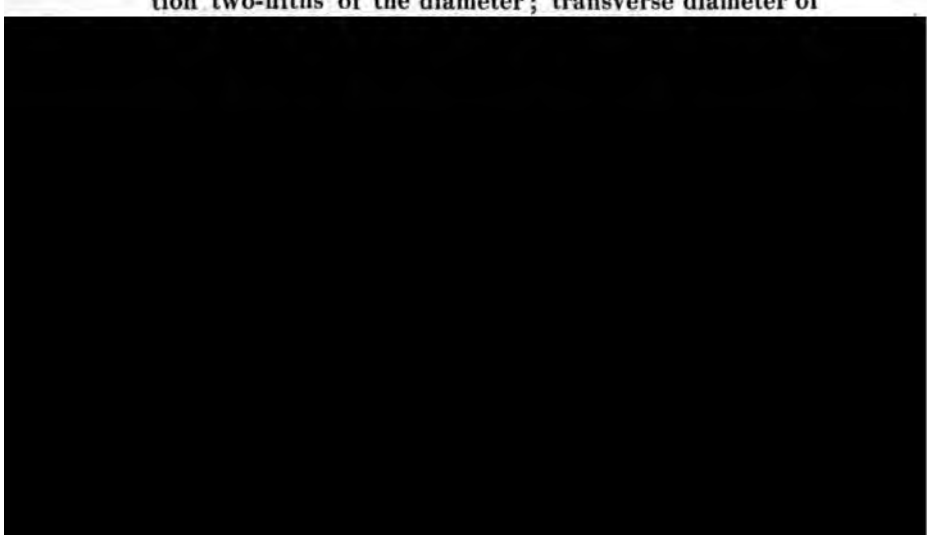
TAB. DLXIV.—*fig.* 1.

SPEC. CHAR. "Discoidal, subumbilicate; volutions depressed, half inserted, transversely radiated; radii annular, distant, bifurcated, undulated; umbilicus expanded, sides smooth, with a marginal row of oblique tubercles; ambit convex, embraced by the radii; aperture ovato-sagittate.

THE volutions, although compressed, have a slight degree of convexity, and are ornamented by transverse radiations that arise from a row of small tubercles on the inner margin. Each radius divides into two branches, which pass with a gentle sweep across the ambit, and unite with the corresponding undulations of the opposite side; small oblique tubercles are placed on each radius at the point of bifurcation.

It is scarcely necessary to remark, that although this species approaches to A. varians in having bifurcating radiations and a row of tubercles on the inner margin, yet it is widely separated from it by the rounded form of the back (front) and other obvious differences.

Longest diameter 3·8 inches; width of the outer volution two-fifths of the diameter; transverse diameter of



AMMONITES Catillus.

TAB. DLXIV.—*fig.* 2.

SPEC. CHAR. Discoid, thin, with obscure, tubercular elevations near the narrow, obtuse edge; inner whorls one-third exposed; aperture lanceolato-sagittate with obtuse angles.

A VERY flat species with only three or four whorls; the surface of it is even, except a row of short tubercles on each side the margin, which degenerate into obscure waves upon the outer whorl. It might possibly be taken for a compressed specimen of A. varians, but it wants both the carina and radii, vestiges of which are distinguishable in the most flattened specimens of the A. varians.

Found in the Malm-rock of Sussex (Upper Greensand) in a quarry at Nursted near Petersfield. We are indebted to Mrs. Murchison for the discovery. The figure is two-thirds of the diameter of the specimen, which is above six inches wide and only nine-tenths of an inch thick.

TURRITELLA granulata

TAB. DLXV.—*fig.* 1.

SPEC. CHAR. Subulate, transversely striated and granulated; whorls about fifteen, their upper edges bordered with an antiquated band.

THE rows of granules between the striæ are very characteristic of this species; they are numerous, but three or four of them are generally larger than the rest.

Very abundant, replaced by Silex, in the whetstone pits at Blackdown, where it appears to be gregarious. It is mentioned as a Turritella by Smith in his Stratigraphical System, p. 25, and figured in his Strata Identified. Parkinson calls it Cerithium turritellatum, which is however a different shell (Org. Rem. vol. iii. p. 71.), so that it does not appear to have been hitherto correctly named.

The group figured is part of a larger one in the cabinet of H. H. Goodhall, Esq.

TURRITELLA abbreviata.

TAB. DLXV.—*fig.* 2.

SPEC. CHAR. Conical, pointed; two small close ridges run round the middle, and one large obscurely granulated ridge forms each edge of every whorl, the produced base has one ridge upon it.

A VERY short turreted shell with about seven whorls. I have not seen the aperture, but judge by the lines of growth and the absence of plaits upon the columella that it is a Turritella.

Found in the decomposing carboniferous Limestone (Mountain Limestone) of Bradley, near Newton Bushel, Devonshire: the specimen is in the cabinet of H. T. De la Beche, Esq.

TURRITELLA Terebra.

TAB. DLXV.—*fig.* 3.

SPEC. CHAR. Turreted, elongated, transversely sulcated; whorls convex, sulci many, nearly equal; spire pointed.

SYN. Turritella Terebra. *Lamarck Hist. Nat.* 7. *p.* 56. Turbo Terebra *Auct.*

IF this differ at all from the recent species, it is in the thickness of the shell and greater distinctness of the whorls; but these differences are very slight.

Found with Rostellaria Pes Pellicani (t. 558.) by Mr. Rose of Swaffham. I suspect both to be shells of a more modern growth than any genuine Crag shells.

TURRITELLA costata.

TAB. DLXV.—*fig.* 4.

SPEC. CHAR. Subulate, striated, rough, costated; the costæ terminate above the lower carinated edge of each whorl; base flat, its edge carinated.

THE carinated edge of this elegant shell forms a thread that winds round the spire separating the costæ of one whorl from those of the next; the whorls are very numerous.

An individual of this species is now and then met with along with T. granulata.

BUCCINUM acutum.

TAB. DLXVI.—*fig.* 1.

SPEC. CHAR. Ovate, elongated, pointed, smooth; volutions convex; aperture elongated, pointed above, nearly half as long as the shell.

SOMEWHAT resembling the following, but longer and more acute, besides being well distinguished by the simple union of the whorls.

This figure is taken from a large individual obtained in Queen's County, Ireland, where the species occurs of various sizes in the Mountain Limestone.

BUCCINUM imbricatum.

TAB. DLXVI.—*fig.* 2.

SPEC. CHAR. Ovate pointed, obscurely striated; whorls about six, their upper edges blunt, produced and pressed against the spire; aperture ovate, elongated, half the length of the shell.

A NEARLY smooth shell, that has nothing remarkable in its general appearance; but the upper edge of each whorl is upon close examination found to embrace the preceding whorl in a peculiar manner.

BUCCINUM breve.

TAB. DLXVI.—*fig. 3.*

SPEC. CHAR. Nearly globose, tuberculated; upper edges of the whorls wavy.

EACH whorl upon the spire, which has only three, is furnished with one row of obtuse knobs; upon the last whorl are exposed three similar rows; the upper edges of the whorls are undulated as they pass over a row of knobs which they conceal; the aperture is nearly round with a short canal at its upper angle; the lower edge is not notched, but only a little bent back, consequently it approaches that of the genus Turbo.

BUCCINUM spinosum.

TAB. DLXVI.—*fig. 4.*

SPEC. CHAR. Conical, elongated with a produced base; a sharp furrow winds round each whorl, a row of large blunt spines is above it; a row of smaller spines surrounds the base.

WHEN perfect, this must have been a handsome shell: the specimens we have now before us are however so

VENUS ovalis.

TAB. DLXVII.—*figs.* 1. & 2.

SPEC. CHAR. Transversely oval, and finely striated, convex, thin; beaks not very prominent; lunette obscure, convex, smooth, elongated.

LENGTH little more than two-thirds the width; the regular oval form and fine concentric striæ distinguish this from every other Venus.

From Blackdown, collected by H. H. Goodhall, Esq.

Fig. 2. is probably a variety: it is so worn that it may have lost the striæ; it differs slightly in the position of the beak, which is further removed from the centre; it was found near Faversham in Kent.

Both specimens are siliceous.

VENUS Faba.

TAB. DLXVII.—*fig.* 3.

SPEC. CHAR. Transversely obovate, elongated, finely striated, convex, flattened in the middle; sides unequal; beaks very short.

MUCH resembling the last, but it is less convex towards the beaks and less pointed at the sides; the length is three-fourths of the width.

A siliceous fossil from Blackdown. Casts also occur at Parham Park and Shanklin Chine.

MEGALODON.

GEN. CHAR. An equal-valved, longitudinal bivalve, acuminated towards the beaks; hinge a long external ligament, a large bifid tooth placed upon a septum across the beak of the right valve, and one irregular and one pointed tooth similarly placed in the left valve; a small pit near the teeth for the reception of the anterior ligament.

A GENUS nearly related to Mytilus, but distinguished by the large teeth of the hinge and weight of the shell. It also resembles Myoconcha; but the situation of the only muscular impression the specimens expose to view indicates its place in a natural arrangement nearer to Mytilus.

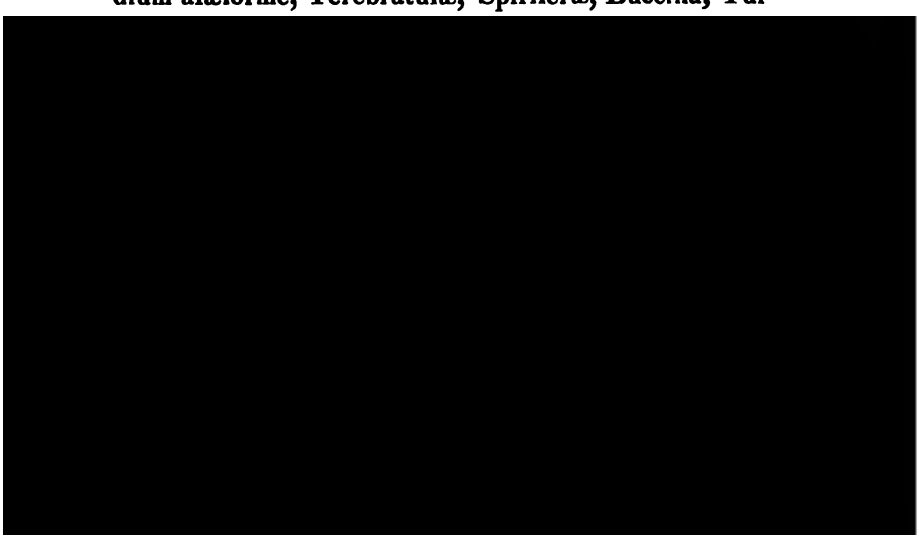
MEGALODON cucullatus.

TAB. DLXVIII.

SPEC. CHAR. .....

A SMOOTH, ovato-lanceolate, thick shell with pointed incurved beaks, the surface is uniformly convex. We have not seen a perfect specimen, so cannot describe the position of the posterior muscle or tendon; for the reception of the anterior one, there is a sharply excavated pit close to the thick plate that supports the hinge teeth.

For the knowledge of this remarkable shell we are indebted to our friend H. T. De la Beche, Esq., who obtained the specimens from the limestone of Bradley, near Newton Bushel, Devonshire. The decomposed state of the stone has much facilitated the development of the hinge. The shells accompanying this are Cardium alæforme, Terebratulæ, Spiriferæ, Buccina, Tur-



AMMONITES complanatus.

TAB. DLXIX.—*fig.* 1.

SPEC. CHAR. "Flat, volutions wholly inserted, the inner half marked with numerous indistinct transverse undulating striæ, the outer portion plicated; umbilicus very small, almost concealed; carene slightly convex, its margins crenated by the angular terminations of the plicæ; aperture sagittate."

"THE longest diameter is about 8 inches, greatest thickness 1·8 inch, width of the outer volution 5 inches.

"The volutions are thickest near the middle, and gradually contract into a narrow keel, which at the aperture does not exceed 4-tenths of an inch in width, and has an elevation or ridge down the centre. . . .The septa are numerous, and very foliaceous.

"Locality, Hamsey."

With Mr. Mantell's kind permission we have figured the specimen from which the above description, copied from his Geology of Sussex, pages 118 and 119, was taken. We know of no other example of the species: it is twice the diameter of the figure. The plicæ do not occur upon the outer volution.

AMMONITES undatus.

TAB. DLXIX.—*fig.* 2.

SPEC. CHAR. Discoid, smooth, with a rounded edge; whorls flat on their sides, their inner edges square; inner whorls partly visible; aperture much elongated, sagittate, with obtuse angles; edge crossed by undulations which proceed a short way over the sides.

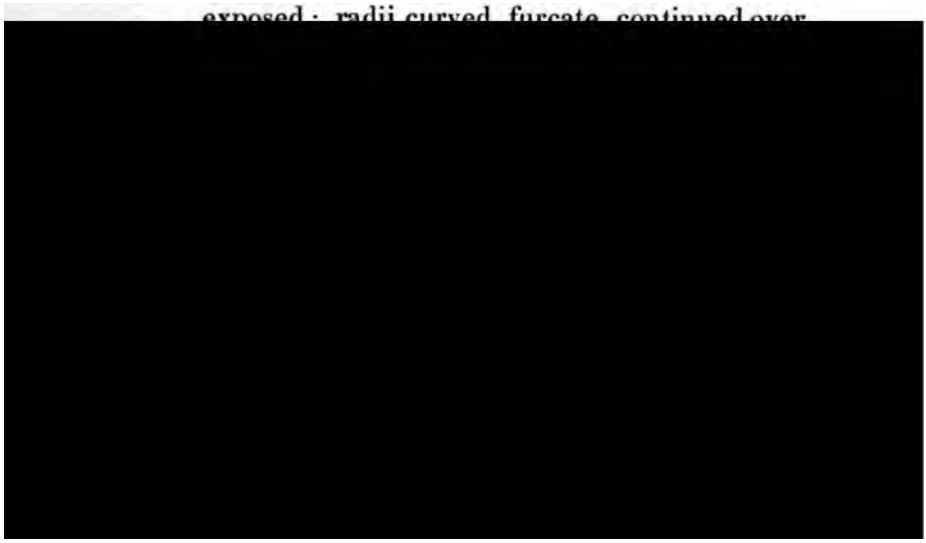
A VERY flat Ammonite, distinguished from all others by the undulations over the edge and square inner margins of the whorls.

This rare specimen was presented to my father in 1820, by G. A. Mantell, Esq., who obtained it from the Upper Chalk of Sussex.

AMMONITES Bakeriæ.

TAB. DLXX.—*figs.* 1. & 2.

SPEC. CHAR. Depressed, radiated; inner whorls exposed; radii curved, furcate, continued over



they are mere lines; thus leading to those Ammonites which have deep furrows in several parts of their whorls, and which have been elevated into another genus. The radii form rings that are split just before they pass over the front. Upon the inner laminæ of the shell these rings are interrupted where they pass over the siphuncle, but on the outer surface they are continuous.

The specimen represented at fig. 1. is a portion of an indurated Marl Nodule found amongst Alluvium in the parish of Braunston in Northamptonshire, by Miss Baker, whose zeal in collecting the natural productions of the district, to assist her brother in a general history, has induced me to commemorate her name.

Fig. 2. represents a cast in Pyrites.

AMMONITES lævigatus.

TAB. DLXX.—*fig.* 3.

SPEC. CHAR. Depressed, smooth; inner whorls exposed; aperture transversely oblong; the edge of the aperture thickened, produced in the front.

THE convex smooth whorls of this shell are so like the innermost ones of some large Ammonites, that I suspect it to be very young, probably the first period of its growth only has been completed. It therefore serves to introduce us to the two following species, as well as to Ellipsolites funatus (tab. *32.*), and Montfort's genus Planulites.

Drawn from a specimen in the collection of H. T. De la Beche, Esq., who found it in the Lyas near Lyme-Regis.

AMMONITES Rotula.

TAB. DLXX.—*fig.* 4.

SPEC. CHAR. Gibbose, smooth, umbilicated; each whorl contracted by six or seven varices; inner whorls partly exposed; front rounded, crossed by many small furrows; aperture orbicular. Whorls very few.

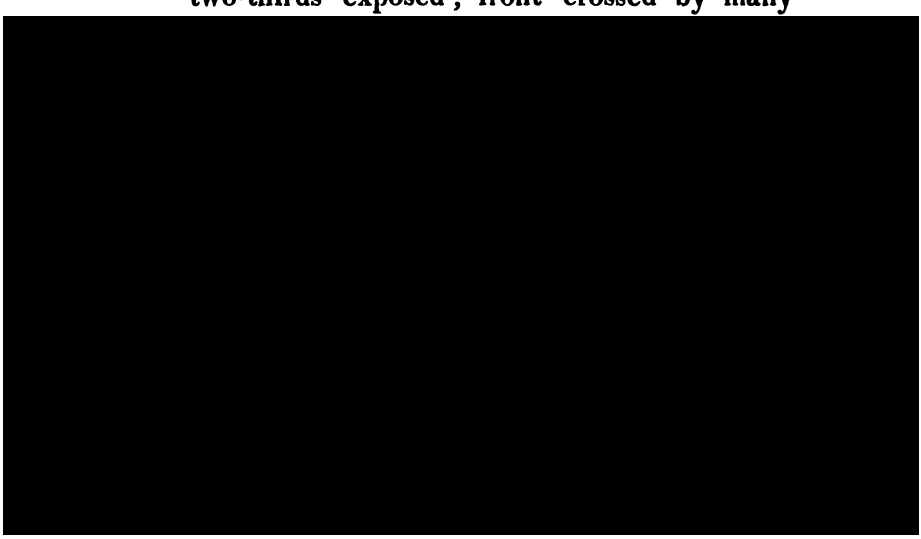
IN this species of Montfort's genus Planulites the contractions of the whorls are very conspicuous. Their number is various; some specimens having seven or even eight in each whorl: they are perfectly independent of the septa.

Casts in Pyrites collected at Speeton on the coast of Yorkshire.

AMMONITES planulatus.

TAB. DLXX.—*fig.* 5.

SPEC. CHAR. Depressed; whorls flat on their sides, contracted by four or five varices; inner whorls two-thirds exposed; front crossed by many



NAUTILUS sulcatus.

TAB. DLXXI.—*figs.* 1. & 2.

SPEC. CHAR. Discoid, minutely striated; whorls almost wholly exposed, ventricose, with two large furrows on each side and several small ones; front concave.

ONE of the remarkable furrows that modify the form of the whorls of this shell is concealed in the inner turns; the concave front is bounded by sharp edges; there is also a sharp elevation between the two furrows: the rest of the side is gibbose, with two or three very shallow broad furrows upon its most elevated part. The aperture is half as long again as it is wide, its sides of course indented: the siphuncle is placed just opposite to the inner indentation; the septa are numerous, with even edges.

Occurs in the Mountain Limestone. We have met with two or three specimens in the late Mr. G. Humphreys's collection, labelled by him as having been found at Castleton.

Fig. 1. shows a cast of the inside. Fig. 2. the external surface of the shell.

NAUTILUS Woodwardii.

TAB. DLXXI.—*fig.* 3.

SPEC. CHAR. Discoid, granulated; inner whorls exposed; sides of the whorls angular; front rounded with a linear sulcus along its middle: aperture obovate with angular sides.

SYN. Conch. Naut. Ammonites Woodwardii, *Martin Pet. Derb.* t. 35. f. 4. & 5.

THE granulations upon this fossil are arranged in concentric lines; they cover the whole surface: the substance of the shell is very thin where the furrow occurs upon the front, for that on the outer whorls is met by a sharp carina in the cast, which is otherwise smooth.

Although from its similarity in form to the preceding

CORBULA elegans.

TAB. DLXXII.—*fig.* 1.

SPEC. CHAR. Subglobose, concentrically sulcated; posterior side produced, smooth, truncated; left valve subtriangular, smooth.

OF this neat little Corbula one valve is gibbose, sharply sulcated, and has a smooth rather curved beak; the other is flatter, angular, and smooth without a beak. It much resembles Corbula gigantea (tab. 209.) in miniature.

Very abundant in the Whetstone Pits at Blackdown.

CORBULA striatula.

TAB. DLXXII.—*figs.* 2. & 3.

SPEC. CHAR. Ventricose, obovate, beaked, minutely striated; valves nearly equal; beak long, straight, channeled within.

A LARGER species than the last, with more equal valves and distinct two-channeled beak.

Very abundant in the ferruginous beds belonging to the Lower Greensand at Pulborough in Sussex. W. P. Martin, Esq. communicated the specimens. The shell has entirely disappeared, but the casts of both surfaces remain very neat;—see fig. 3.

CORBULA rotundata.

TAB. DLXXII.—*fig.* 4.

SPEC. CHAR. Obovate with produced beaks, gibbose, concentrically sulcated; sides nearly equal, the posterior slightly truncated.

THE lesser valve of this is probably smooth, but the specimen is too much worn to be depended upon.

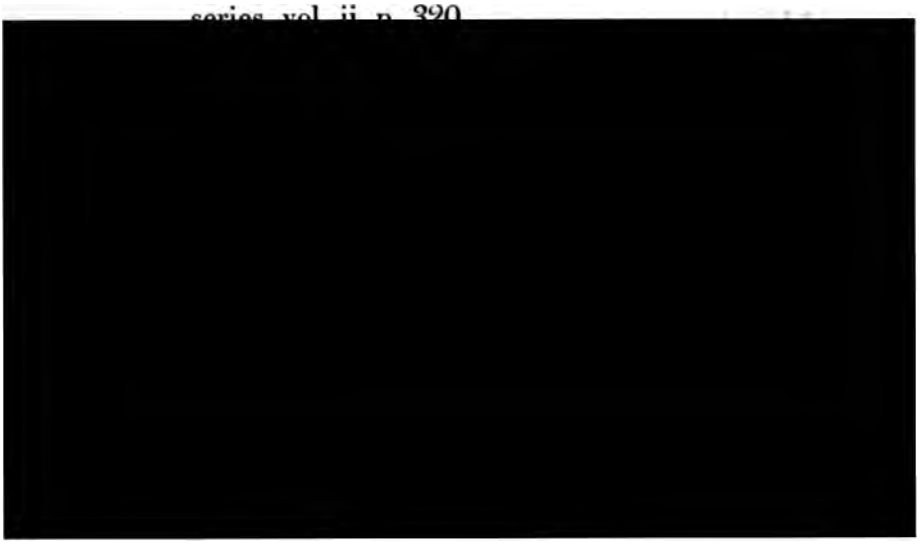
Found in the Crag of Suffolk. The specimens figured are from Holywells, presented by the late Mrs. Cobbould.

CORBULA obscura.

TAB. DLXXII.—*fig.* 5.

SPEC. CHAR. Obovate, gibbose, smooth; posterior side flattened, so as to form an angle upon the surface.

SYN. Corbula (*new species*). *Trans. Geol. Soc.* 2d series, vol. ii. p. 320.



PETRICOLA. *Lamarck.*

GEN. CHAR. An unequal-sided, equal-valved, transverse bivalve; the anterior side smallest, rounded, the posterior produced, rather gaping; teeth of the hinge three or four, small, curved; no lateral teeth; a large sinus in the mark of the attachment of the mantle; ligament external, short.

UNDER the generic name Petricola are arranged some of the shells belonging to animals that have the power of forming hollows in calcareous rocks, not by a rotatory motion as the Pholas does, but by some solvent power that enables them to make holes that nearly fit the shells. Dirt and foreign substances that are not calcareous often make way into these holes; and as they cannot easily be removed, they interfere with the growth of the shells, which are consequently often distorted *.

The species are almost as variable in their external forms as in the number and form of their teeth; some are nearly smooth, others striated and even rough like Pholades, some depressed, others gibbose; they are mostly white, but one or two are coloured. They are all tender shells.

* Lithodomi and some other boring shells belong to animals possessed of the same power, and which at the same time line a portion of the hole with a calcareous deposit. The animals of many spiral shells operate in a similar way upon their own shells, removing parts of their surface or spines to lighten them or make room for their further growth. In these cases, does the animal secrete two kinds of fluid, or, which seems more probable, is it endowed with the faculty of changing the electric state of the same fluid, so as to make it dissolve or deposit the lime at different seasons or as occasion may require?

PETRICOLA laminosa.

TAB. DLXXIII.

SPEC. CHAR. Ovate, gibbose, ornamented with erect concentric laminæ; posterior side subcuneiform; one broad bifid tooth in the left valve, two small teeth in the other.

THIS is the largest species of Petricola known; the laminæ upon its surface are entire, rather thick, and tolerably close set; they distinguish it from every other.

Found by the Rev. G. R. Leathes in the Suffolk Crag; who has kindly allowed us the use of the only specimens he has.

Fig. 1. represents two views of the left valve of a regularly grown shell: Fig. 2. the same valve from a distorted individual: Fig. 3. the inside of the right valve,

PECTEN dentatus.

TAB. DLXXIV.—*fig.* 1.

SPEC. CHAR. Nearly orbicular, convex, minutely striated concentrically, ribbed; ribs about twenty close, large, angular, obtuse; ears defined, small; margin deeply toothed; valves similar.

THE peculiar characters of this Pecten are, the sharp projection of the edge between each rib and the flat inclined sides of each rib.

Several specimens of this fossil are in the collection of Miss Baker, who found them in transported fragments of limestone, in what are there called gravel-pits, at Bugbrook and Staverton, in Northamptonshire. It also occurs in the valley of Catmus in Rutlandshire. The figure is taken from a specimen which has both valves, but wants the ears; they are supplied from another, in other respects inferior, individual.

PECTEN granosus

TAB. DLXXIV.—*fig.* 2.

SPEC. CHAR. Nearly orbicular, oblique, convex; surface marked with about thirty granulated rays, and as many nearly smooth ones, alternating with them; ears undefined, unequal, extending nearly the width of the valve.

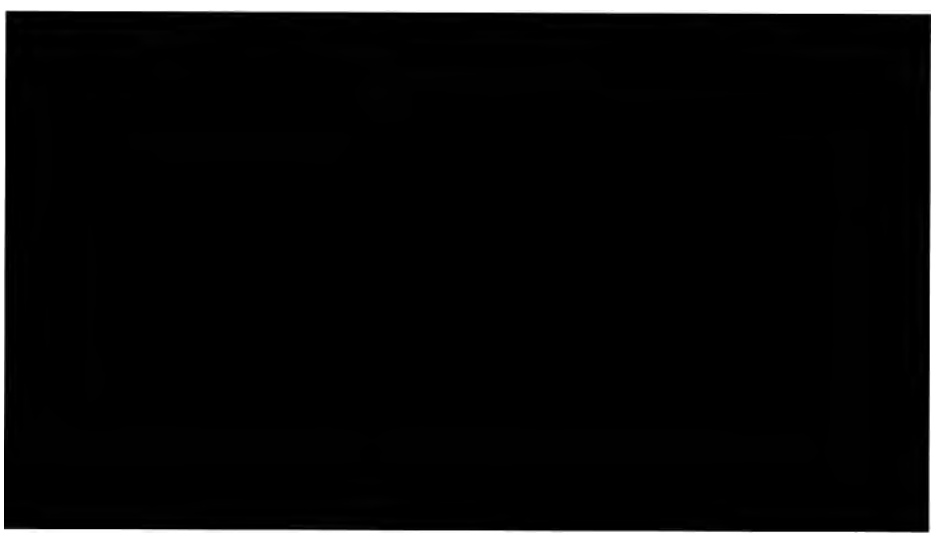
RATHER wider than long; the ears, although they form a long hinge line, are narrow and small; the alternately large and small rays are very regular.

Found in the Black Limestone in Queen's County, Ireland.

PECTEN plicatus.

TAB. DLXXIV.—*fig.* 3.

SPEC. CHAR. Nearly orbicular, oblique, convex, with numerous irregular, elevated, smooth striæ; ears undefined, unequal, extending the whole width of the shell.



PECTEN duplicatus.

TAB. DLXXV.—*figs.* 1. 2. & 3.

SPEC. CHAR. Orbicular, depressed, radiated; one valve nearly smooth, the other very rough and ornamented with many distant, thin, round ribs, which become more numerous towards the margin; ears defined, small.

ONE of the valves has the surface covered with minute sharp scales; the other is smooth and almost free from ribs, being only undulated in their places: this is the most convex, the inside of both valves is nearly plain. Near the beak the ribs are about ten; but at the margin there are forty, in consequence of the interposition of new ones as the shell increases in size.

First found 200 feet from the surface in a well dug in London Clay on the top of the hill in Richmond Park. See fig. 3. In Hyde Park it has been found whenever the Clay has been exposed. The specimen delineated at figs. 1. and 2. was kindly given me by Mr. Marshal, who collected several last year.

PECTEN carinatus.

TAB. DLXXV.—*fig.* 4.

SPEC. CHAR. Orbicular, rather elongated, convex, smooth, ribbed; ribs about seventeen, distant, rounded, with a sharp keel along the middle of each; ears defined, rather large; internally sulcated.

BETWEEN each of the broad carinated ribs is an equally broad flat smooth space, along whose middle there generally runs a sharp line: the ears are square and ample; the valves are equally convex.

Found in Barton Cliff, and also in other parts of Hampshire.

PECTEN reconditus.

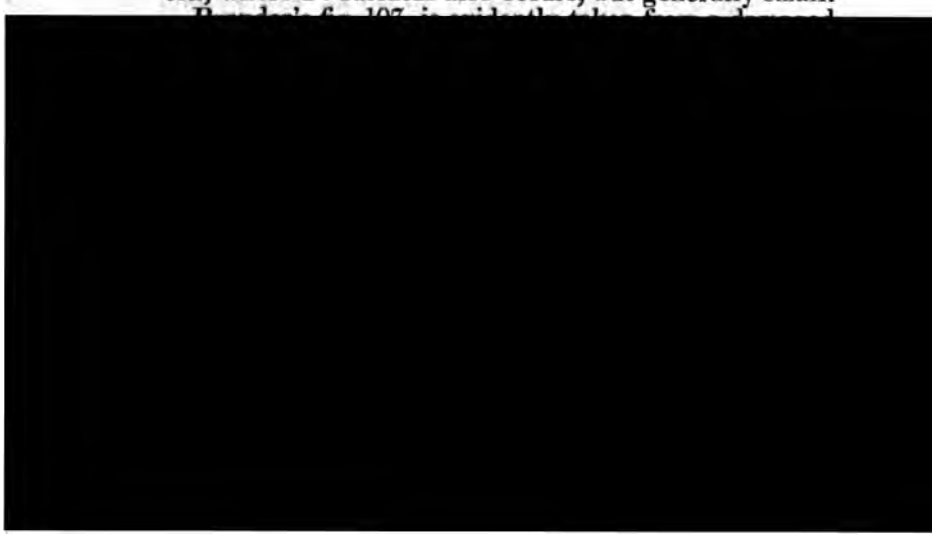
TAB. DLXXV.—*figs.* 5. & 6.

SPEC. CHAR. Orbicular, oblique, with above twenty rounded rays, the intermediate spaces not longitudinally striated; the whole surface covered by concentric lines of sharp scales; valves unequally convex, sulcated within; ears defined, nearly equal.

SYN. Ostrea recondita? *Brander, fig.* 107.

VERY nearly resembling Pecten sulcatus (tab. 393. fig. 1.), but there is something, not easily described, in its general aspect, that has caused it to be separated by several acute observers. The most obvious mark of distinction is the want of longitudinal striæ between the rays; each ray at a little distance from the beaks is furnished with three rows of scales, while the spaces between the rays have only one large scale: the valves only differ in convexity, together they are more convex than those of P. sulcatus, and more unequal.

Common in Crag on various parts of Norfolk and Suffolk; it is also sometimes found at Stubbington and Barton, where P. sulcatus also occurs, but generally small.



TEREBRATULA porrecta.

TAB. DLXXVI.—*fig.* 1.

SPEC. CHAR. Nearly square, with rounded angles, convex, smooth; beak of the larger valve very much produced, pointed, slightly curved, the area within it large; margin sharp.

MOST specimens have the beak of the larger valve almost straight: it is perforated, but the perforation is elongated and placed within the sharp apex, and pointing towards the sinus in the area, which it nearly meets: the largest specimen is wider than long; the others vary, but in general are longer than wide, with an obtuse angular front.

From the Carboniferous Limestone of Bradley, described in a paper now in course of reading before the Geological Society, from H. T. De la Beche, Esq. It was accompanied by several uncommon shells. See tab. 566. p. 128.

TEREBRATULA variabilis.

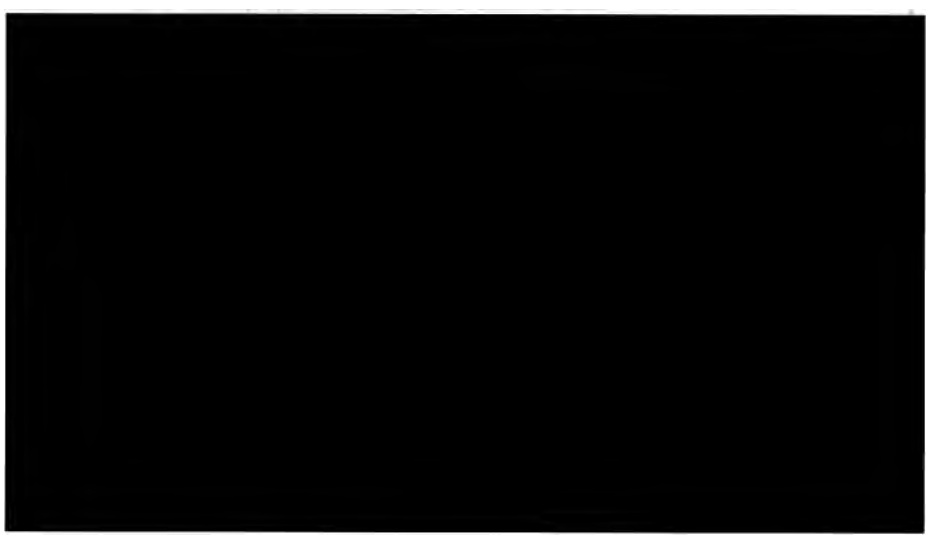
TAB. DLXXVI.—*figs.* 2—5.

SPEC. CHAR. Orbicular or oblong, very convex, smooth; the beak of the larger valve produced, truncated, with a round perforation.

ALWAYS very convex, but varying in shape from oblong oval to orbicular: the beak is large, straight, and truncated deeply; the area within it is convex, with a large sinus.

A very abundant fossil in the Crag; but the valves are never found joined, and are always much worn.

Figs. 2. and 4. are from specimens collected by our zealous geological friend Mrs. Murchison.



SCALARIA frondosa.

TAB. DLXXVII.—*fig.* 1.

SPEC. CHAR. Conical, elongated, costated, smooth; costæ membranous, recurved, their upper parts produced into concave spines; volutions distinct, but close, about seven.

A VERY distinct and extremely beautiful shell. The very thin costæ are very uniform; there are about twelve upon each whorl: it is rather a shorter shell than the S. acuta.

The unique specimen figured is from Crag. It graces the splendid collection of the Rev. G. R. Leathes.

SCALARIA acuta.

TAB. DLXXVII.—*fig.* 2. and TAB. XVI.

Var. *mutica*: costæ thick, sharp-edged, reflected, unequal, not produced above into a spine.

ABOUT an inch long and four-tenths wide. The volutions are ventricose, with about sixteen costæ upon each.

Collected in the London Clay in Alum Bay, Isle of Wight, by G. E. Smith, Esq.—It was not until the plate was finished that I discovered this to be only a variety.

SCALARIA interrupta.

TAB. DLXXVII.—*fig.* 3.

SPEC. CHAR. Subulate? transversely striated, costated, with one large varix upon each whorl; costæ numerous, obtuse, slightly elevated, united at both ends by transverse ridges; whorls united, convex.

THE most remarkable character in this Scalaria is the union of all the ribs together by two transverse ridges, forming the exact resemblance to a spirally curved rope ladder.

The only specimen we have seen of this consists of about two whorls: it is preserved by H. J. Goodhall, Esq., who brought it from Barton Cliff.

SCALARIA undosa.

TAB. DLXXVII.—*fig.* 4.

SPEC. CHAR. Subulate, transversely striated, costated; costæ numerous, slightly elevated, crossed by the striæ, terminating in a band that covers the base; volutions united, convex.

COSTÆ about twenty-four upon each whorl, waved, broad, and very slightly raised; the base is nearly smooth, being only marked lightly by lines continuing from the costæ.

An imperfect specimen from Barton is in Mr. Goodhall's collection.

SCALARIA reticulata.

TAB. DLXXVII.—*fig.* 5.

SPEC. CHAR. Subulate, short; surface reticulated; whorls united; columella hollow; base smooth.

SYN. Turbo reticulatus. *Brander, fig.* 27.

EIGHT whorls compose this shell, which is only about half an inch long; nine or ten prominent transverse striæ cross numerous not more prominent ribs, forming a network that covers the convex whorls, and is bounded by a nearly smooth band extended over the base.

Presented many years ago by Miss Bemister: found at Barton. Miss Teed has in her cabinet a broken individual above an inch long.

MUREX Smithii.

TAB. DLXXVIII.—*fig.* 1. 2. & 3.

SPEC. CHAR. Pyriform, transversely striated, furnished with three rows of short tubercles, those of the upper row largest, pointed; beak elongated, straight; upper parts of the whorls flattened.

Var. β. spire produced: fig. 3.

THE spire being very short, the last whorl very large, and the beak much produced, give the pear-like form to this shell: two rows of the tubercles are wholly concealed within the last whorl. When the shell is removed from the stone, the cast of the spire appears longer, and in var. β. it is so much produced as to show the middle row of tubercles.

The beautiful specimen represented at figs. 1. and 2. is nearly covered by a Flustra: it was collected in Alum Bay, Isle of Wight, by Gerrard E. Smith, Esq., whose zeal we wish to commemorate by naming it after him. The variety fig. 3. is a cast found at Maida Hill, Paddington: it is in the collection of G. A. Mantell, Esq., who also possesses a cast of the first variety imbedded in part of a Septarium from Bognor. It seems to be a rare London Clay shell, as we know of no other specimens.

MUREX tuberosus.

TAB. DLXXVIII.—*fig.* 4.

SPEC. CHAR. Ovate, pointed, transversely striated; one row of blunt tubercles upon the upper part of each whorl; whorls squarish; spire as long as the last whorl; beak produced.

A GENERAL bluntness in the outline of this shell gives it some resemblance to a tuberose root. The length of the aperture is about equal to the diameter of the last whorl, which is something greater than the length of the spire.

Casts in compact oolitic limestone, with small portions of the shell replaced by calcareous spar, are not unfrequent in the Pisolite at Malton. We have never met with a specimen sufficiently perfect to determine the form of the beak by, or even to ascertain for certain the true genus to which to refer the species.

MUREX Harpula.

TAB. DLXXVIII.—*fig.* 5.

SPEC. CHAR. Obovate, squarish, pointed at both ends, decorated with numerous longitudinal ribs; spire very short, aperture nearly orbicular; beak straight.

CLOSE, thin, oblique ribs, squarish whorls, broadest

AMMONITES falcatus.

TAB. DLXXIX.—*fig.* 1.

SPEC. CHAR. Discoid, subumbilicate, radiated; whorls crenated and flat at both edges, the inner ones almost concealed; radii falciform, bent in the middle; aperture sagittate with truncated angles.

SYN. A. falcatus. *Mantell Geol. Suss. p.* 17. *tab.* 21. *f.* 6. & 12.

"THIS rare and elegant species is almost flat, the longest diameter exceeding its greatest thickness nearly four-fifths. The volutions are slightly enlarged in the centre, but are contracted at the ambit .... with delicate plicated edges. The radii are very slender at their origin in the umbilicus, but gradually increase in breadth; and passing obliquely to the centre of the volutions, make a sudden curve towards the margin, where they terminate in obtuse folds." The front is very narrow and flat; the cast of it shows a furrow along the middle in which the siphuncle was placed.

I am indebted to Mr. Mantell for permission to figure his best specimen, which was found at Middleham in Gray Chalk Marl.

AMMONITES curvatus.

TAB. DLXXIX.—*fig.* 2.

SPEC. CHAR. Discoid, subumbilicate, radiated; inner whorls almost concealed; radii falcate, near equal over half the whorl, then bent, and alternately broad and narrow; the broad ones furnished with two tubercles each near the front, the narrow ones gradually lost towards the front; front flat, narrow; umbilicus large, with a row of flattened tubercles around it; aperture obtusely sagittate.

SYN. A. curvatus. *Mantell Geol. Suss. p.* 118. *tab.* 21. *f.* 18.

"THIS Ammonite is nearly allied to the preceding, but is evidently a distinct species. In A. falcatus the curvatures are more numerous than the oblique radii; but in the present species the proportions are reversed, two or three radii uniting to form one curved rib. The terminations of the ribs in the latter are tubercular, and separated from each other by a sulcus; in the former they are gently curved, and appear as if folded or plaited over each other. The umbilicus is rather deeper than in A. falcatus, and has a marginal row of oblique tubercular projections, from each of which two or three radii

CORBIS. *Cuvier.*

GEN. CHAR. A free, transverse, equal-valved, bivalve, with incurved umbones; two lateral and two hinge teeth in each valve, one of the lateral teeth near the hinge, the other remote; attachment of the mantle upon a curved, not sinuated line.

"ALL the species of this genus that have hitherto come under observation are transverse shells (that is, they are longer in a direction transverse to the position of their hinge-teeth): in common with many other bivalves, the umbones are curved inwards, in opposite directions in the two valves; there are two cardinal and two lateral teeth in each valve; that which is on the opposite side of the hinge to the ligament, is much nearer to the cardinal teeth than the other, which is rather remote, but placed near the termination of the ligament. This is external; but the parts to which it is attached form a deep groove when the two valves are closed; when also, a rather oblong cordiform impression immediately behind the umbones may be observed.

"This Genus was established by Cuvier, and is adopted by Lamarck. It is related to Lucina, but may be distinguished from that genus by its muscular impressions, which are simple and rather oblong, but neither of them produced into an elongated tongue shape; it approaches also to Tellina, but, wanting the fold of the anterior (posterior) margin of that genus, it will not be confounded with it. Not many species of this genus are yet known; the only recent one with which we are acquainted is a very beautiful, transversely oval, rather gibbous shell, with longitudinal striæ and undulated transverse furrows, and its interior margin is crenulated; it is the Venus fimbriata of Linné, the Corbis fimbriata of Cuvier, and according to Lamarck an inhabitant of the Indian

Ocean. Two fossil species are described by Lamarck, both of which are found in the more recent formation above the Chalk; one at Grignon, and the other at Granville. Neither of them are so gibbous as the recent one. Several others are now known.

"Whether the shells of this genus be covered with an epidermis in their natural state or not, we have no means of ascertaining; there is, however, some reason for believing this to be the case."

The above description is taken from my brother's "Genera of Recent and Fossil Shells," No. 2. I have only to add, that the hinge teeth are unequal, that the anterior side is largest, and that the recent species is nearly colourless.

CORBIS lævis.

TAB. DLXXX.

SPEC. CHAR. Transversely oval, elongated, rather gibbose, smooth except a small portion of the posterior extremity which is transversely undulated or rather imbricated; margin entire.

IN the general form of the valves and the disposition of the muscular impressions, this agrees well with the genus Corbis: the hinge is somewhat different, but as one of the remote teeth is worn away, and the whole cannot be relieved from the stone, we will not venture to say that

PHOLAS priscus.

TAB. DLXXXI.

SPEC. CHAR. Oblong oval, finely striated; striæ smooth, transverse; anterior extremity rounded very short, with a deep angular sinus in its edge, becoming closed by shell when old; posterior extremity truncated; beaks covered by an accessory valve; a series of scales form a longitudinal band nearly in the middle of each valve.

A SMALL species, very similar to P. clavata of Lamarck and others, that dwell in holes they form in wood. The anterior side is very small; its edges near the beaks are reflected and covered by a heart-shaped valve. In the young state of the animal the sinuses in the valves form a rhomboidal opening, which in the adult is closed by a smooth continuation of the shell.

For the discovery of this highly interesting Fossil we are indebted to H. H. Goodhall, Esq. Wood penetrated

by Teredines had long been known in a fossil state; but the genus Pholas was unknown, except in Crag, until Mr. Goodhall was so fortunate as to pick up the specimen here figured, behind Lord Darnley's park. It is a siliceous mass, from the uppermost stratum of Limestone near Sandgate. Exposure to the weather has laid open the shells to view in their natural situations in the fossil wood, part of which, being impregnated with silex, is preserved around the stony matter that has filled their cells. The mass also contains numerous single valves of a small Avicula.

INOCERAMUS latus.

TAB. DLXXXII.—*fig.* 1.

SPEC. CHAR. Ovato-rhomboidal, depressed, concentrically undulated; valves equal; anterior side * concave; posterior side broad, expanded towards the very oblique hinge line; beaks small, short.

SYN. Inoceramus latus. *Mantell, Geol. Suss.* 216. *t.* 27. *f.* 10.

A LARGE flat species, almost uniformly covered with large, slightly elevated, angularly bent undulations or ridges, and sharp striæ. The part upon which the hinge line is placed does not form a lobe, but is an almost smooth projection, that completes the rhomboidal form of the margin. The regularity and obliquity of the undulations distinguish this from I. Cuvieri, which is either plain, or has a few large irregular waves upon its surface.

At the time Inoceramus Cuvieri was published in "Mineral Conchology," I did not possess characteristic specimens of the I. latus. Such have been supplied by C. B. Rose, Esq. from the Upper Chalk near Swaffham, Norfolk. In size it equals I. Cuvieri, acquiring eighteen inches or more in length. The front is often suddenly deflected.

* In the descriptions of the species of Inoceramus formerly given, this is called the *posterior* side; whereas the side upon which the ligament of the hinge is placed is the posterior.

INOCERAMUS striatus.

TAB. DLXXXII.—*fig.* 2.

SPEC. CHAR. Subglobose, even, concentrically striated, the striæ accompanied by shallow furrows; anterior side concave, smooth.

SYN. Inoceramus striatus. *Mantell, Geol. Suss.* 217. *t.* 27. *f.* 5.

THIS rare species has not been found sufficiently perfect to exhibit all its characters. Its valves, however, appear to be equal, and the beaks very short and blunt. Its form readily distinguishes it from I. mytilloides, which it accompanies in Sussex and Wiltshire. The specimen figured is from Heytesbury. I am indebted to the intelligent author of the "Geology of Sussex" for it.

INOCERAMUS involutus.

TAB. DLXXXIII.

SPEC. CHAR. Subglobose; valves very unequal; one gibbose, even, with a large incurved beak and very hollow sides, the other nearly flat, with deep concentric waves; its margin very thick, deflected; hinge line upon an elevated narrow lobe.

thickness I have observed in any shell within the same extent of surface; some parts near the edge being almost half an inch thick, while others near the beaks (only three or four inches distant) are as thin as card-paper.

For several fine illustrative specimens of this species, mostly too large to figure even in a quarto plate, I am indebted to C. B. Rose, Esq.: they are from the Upper Chalk of Swaffham and West Lexham, Norfolk. Fig. 1. is taken from a pair of shells, filled with flint, that was bought at Mr. Parkinson's sale. Fig. 2. is from a portion of the flatter valve picked out of a Chalk-pit at Bury St. Edmonds by the Rev. J. Holme, M.A. F.L.S.

The inequality of the valves of this shell, which cannot be separated from Inoceramus, proves the impropriety of forming two genera.

While the above was in the press, I received the specimen represented at fig. 3. from the Rev. G. R. Leathes. It came from the Bury Chalk.

INOCERAMUS gryphæoides.

TAB. DLXXXIV.—*fig.* 1.

SPEC. CHAR. Ovate, ventricose, concentrically undulated; valves unequal, the smallest gibbose; beaks incurved, pointed, approximated.

So nearly does this resemble I. concentricus, that, except size and the close beaks, we can see no marked difference; yet few persons would be induced to consider them the same species.

From the Green Sandstone west of Lyme Regis, in Dorsetshire. Large pearly fragments also occur in Blue Marle at Ringmer in Sussex, which are probably the same species. It is too gibbose for either I. tenuis or I. Cripsii,—our specimens of which are not perfect enough to describe.

INOCERAMUS vetustus.

TAB. DLXXXIV.—*fig.* 2.

SPEC. CHAR. Ovate, convex, smooth, regularly undulated; valves nearly equal; beaks short, pointed, curved; a concave space in the anterior side resembling a large lunette; hinge line short.

VERY regularly arched and gradually rising undulations of a smooth surface distinguish this from I. Brongniarti, independently of the difference in the anterior side. I have not seen the hinge, but the line to which it is attached is short; the front is very round.

Occurs in the Mountain Limestone at Castleton in Derbyshire, and near Settle in Yorkshire.

INOCERAMUS dubius.

TAB. DLXXXIV.—*fig.* 3.

SPEC. CHAR. Ovate pointed, concentrically striated and indistinctly waved; valves unequal, both convex; beaks short, pointed.

STRONGLY resembling I. concentricus. The convexity

PECTEN grandis.

TAB. DLXXXV.

SPEC. CHAR. Suborbicular, wider than long, concentrically striated, furnished with thirteen much elevated, rounded, more or less compound rays, each of which has generally a sulcus along its middle, and between each is a single secondary ray; one valve rather convex, towards the beak concave, the other very convex; ears nearly equal, square.

A LARGE Pecten, in general shape resembling P. maximus, but differing in the form and structure of the rays. The concentric striæ, as in P. maximus, are very irregular, and but little elevated upon the convex valve, while upon the other they are very regular, close, and raised into sharp laminæ: the rays upon the convex valve especially are more elevated and deeply divided or sulcated, approaching to the form of those of P. Jacobæus, but differing from them in being much smoother and rounder.

The Rev. G. R. Leathes, to whose liberality I am indebted for a series of specimens of this species, has "selected the trivial name *grandis* for it;—not but that there are several fossil species found much larger, but as approximating to *maximus*, given to our common Escallop."

Occurs at Ramsholt in a native bed, and Newbourn, and in various other parts of the Suffolk Crag.

PECTEN complanatus.

TAB. DLXXXVI.

SPEC. CHAR. Suborbicular, wider than long, ornamented with thirteen broad flat elevated rays, concentrically striated; one valve nearly flat, concave near the beak; ears equal, square.

SIMILAR in size and shape to P. maximus, but distinct, the rays being flat, with nearly perpendicular sides; the two lateral rays are blended with many striæ upon the sides of the valve. The two valves have not, that I know of, been discovered in contact: we are therefore unacquainted with its particular characters; the flatter one is less convex than that of either P. grandis or P. maximus.

Our intelligent friend Mrs. Murchison has obtained several valves of this species from the Crag at Aldborough, and near Ipswich. It is also in the cabinet of the Rev. Mr. Leathes: but it is by no means so common

AMMONITES Woollgari.

TAB. DLXXXVII.—*fig.* 1.

SPEC. CHAR. Compressed, carinated, radiated; whorls three or four, the inner ones partly concealed; radii distant, upon the inner whorls curved and prominent, each furnished with three tubercles, the outer of which is flat and small, as the whorls increase the middle row of tubercles expands so as nearly to occupy the whole ribs and form large blunt spines; keel deeply serrated.

SYN. A. Woollgari. *Mantell, Geol. of Suss. p.* 197. *tab.* 21. *f.* 16. & *tab.* 22. *f.* 7.

THE central whorls of this fossil, separated and compared with the external one, would never be thought the same species; they are compressed, and crossed by prominent curved rays, while the outer one is ventricose and furnished with about ten large conical spines on each side, placed opposite to each other, with one tooth of the carina in the middle of each pair: in the smaller whorls each ray has a flattened tubercle placed near and parallel to the keel; within this is another smaller tubercle, which as the whorls proceed is greatly enlarged and blended with a third tubercle, that seems gradually to recede from the inner edge of the whorl until it is lost; the flat tubercle still remains more or less distinct.

A handsome and scarce shell, peculiar to the Lower Chalk near Lewes in Sussex.

The figure is from the same adult specimen of which Mr. Mantell has given a diminished representation in his very complete work. I beg to acknowledge his kindness in allowing me free use of it, as well as of many other rare specimens.

AMMONITES tetrammata.

TAB. DLXXXVII.—*fig.* 2.

SPEC. CHAR. Discoid, carinated, tuberculated; volutions about four, convex, crossed by many obscure rays, upon each of which are four tubercles, each alternate ray has a branch with two tubercles; outer tubercles compressed; keel entire, sharp.

THIS Ammonite, as far as we at present know, varies but little in its different stages of growth. It bears a great resemblance to some of the forms of A. varians (t. 176.), but is a larger shell; and the four rows, instead of three, of tubercles distinguish it.

We received a specimen of this many years ago from our kind friend G. A. Mantell, Esq. It is rather less

ORTHOCERA fusiformis.

TAB. DLXXXVIII. *figs.* 1. & 2.

SPEC. CHAR. Fusiform.

A MIDDLING-SIZED Orthocera: it is smooth, round, and rather rapidly tapering towards both ends, the open end truncated; the siphon nearly central; the last chamber is large, commencing at the widest part.

Occurs in the Black Limestone of Ireland, particularly in Queen's County, where it is, in common with other fossils, often variously curved (See a portion at fig. 2.) by some change the rock has undergone subsequently to its being deposited. The last chamber is rarely found. The specimen figured (fig. 1.) enriches the collection of W. Gilbertson, Esq., who obtained it near Preston in Lancashire, from a Limestone corresponding in its contents very closely with that of Ireland. A great portion of the last chamber has been filled with loose earthy matter that settled to one side, and being easily removed, has left the last septum with the opening into the siphon very distinct: a few minute crystals of quartz are scattered over the surface.

ORTHOCERA cincta.

TAB. DLXXXVIII.—*fig.* 3.

Spec. Char. Nearly cylindrical, surface ornamented with numerous sharp annular striæ; siphon central.

In this species the septa are rather more concave than is usual, and also distant. The transversely striated surface is what it is best distinguished by, and seems to indicate a shell formed outside the animal.

I have seen but one specimen; it was lent me by Dr. A. Moore, who obtained it near Preston.

BELEMNITES. *Auct.*

GEN. CHAR. An elongated, straight, ponderous, univalved, shell; cavity much shorter than the shell, conical, divided by septa which have entire even edges, and are penetrated by a lateral siphuncle.

THE shells of this long-known genus are all much elongated, never spiral nor even curved, except very slightly in one or two species near the apex. The chambered cavity is composed of thin laminæ, exactly similar to the corresponding part in Nautilus, except that it is a straight, not an involute, tube or cone: this is surrounded by a coat formed of layers of fibres of a laminated or sparry structure, placed nearly perpendicularly to the surface, and corresponding to the outer coloured coat of Nautilus* or shells generally, but with the crystalline tissue much more largely developed than even in Pinna, with which Mr. Miller has very justly com-

* In speaking of the various parts of a Belemnite, we shall keep in view this analogy: the pointed extremity will thus be considered as the *apex*, the opposite end the *base*, and the side on which the siphuncle is placed the (as in Ammonites) *front*: we say the front, because that part of the base or aperture seems similarly situated to the anterior margin in the genus Helix. We cannot agree, when we are describing a Nautilus or Ammonite, to call this the back, which has often been done by other writers. This part in the Belemnite is by Blainville termed "*ventrale*;" in Spirula the position of the siphuncle is reversed.

pared it. This fibrous coat is so much produced beyond the apex of the chambered cavity upon an axis, (or elongated nucleus which probably existed in the ovum,) that it often forms the largest portion of the shell: in this circumstance principally it differs from Orthocera, the genus next akin to it. The genuine fossil Orthoceræ (no fossil Orthocera is given by Lamarck) have, moreover, a central siphuncle; and were, at least some species, external shells. A few fossils hitherto referred to that genus, would deservedly arrange under an intermediate one.

Much has been written about the nature of the animal of which the Belemnite formed a part. The opinions of Platt and Miller agree, as far as they suppose it to have inclosed the shell by two lobes curved round it so as to meet in a line along the front: the smooth surface, showing the impression of ramose veins in many species, and fibrous structure of the external coat, in which it resembles Cypræa, greatly favour this opinion.

Lamarck, justly considering the chambered cone very similar to the genus Nautilus and Spirula, the animals of which were known to resemble Sepia, has placed Belemnites, Orthocera, Nautilus, and all the chambered shells, with Sepia in the fourth order of Mollusca, the Cephalopoda, and appears to consider the Belemnite an internal

forms in the series including Belemnites, between this head and Nautilus. The first, Beloptera sepioidea *, generally known as a fossil Sepia, has septa half closing an expanded cavity. The second, B. belemnitoidea †, has septa quite across a conical cavity: but it is not proved that either of these was wholly internal, while it is known that the shell of Spirula is partly external, and the shell of Nautilus almost wholly so. Now it appears very probable that the Belemnite was inclosed, not entirely within its animal, but within two folds or lobes of its mantle or skin, partly, as supposed by Mr. Miller; these lobes, however, might be similar to what would be produced by making an incision along the back of a Sepia so as to let the apex of its bone protrude, and so bear an analogy to the two lobes that inclose the spirula, and not be produced by curving the edges or wings (fins) of the animal around it, as described by Mr. Miller.

The idea of the shell having undergone any such an alteration by mineralization as to produce the fibrous structure, is not consistent either with Mr. Miller's experiments on the general characters of changed fossil shells, wherein the internal tissue is generally wholly destroyed, as in Echinus' spines or siliceous casts, and even in parts of some Belemnites.

Lamarck and all modern authors, except M. de Blainville, yielding to old prejudices, have continued to describe the Belemnite as composed of two parts; the etui,

* Sepia Cuvieri. *D'Orbigny, Cephalopodes*, p. 66.

† Sepia parisiensis, *ib.*—A third species of this genus without lateral projections has been found at Highgate, and forms an additional link. (See tab. 591.)

sheath or guard, and the alveolus. Now the alveolus is composed of foreign matter that has insinuated itself into the chambers of the conical cavity, and becoming stony is easily separated from that cavity, tearing the fragile septa away with it, (when this consists of sparry matter it may be observed, that it is of a different character from the sheath, which confirms the opinion of the latter not being mineralized,) but leaving the edges of the septa attached to the inner almost pearly coat of the shell. Lamarck states the siphuncle to be central, which it never is in Belemnites: he has probably intended to include fossil Orthoceratites in the same genus.

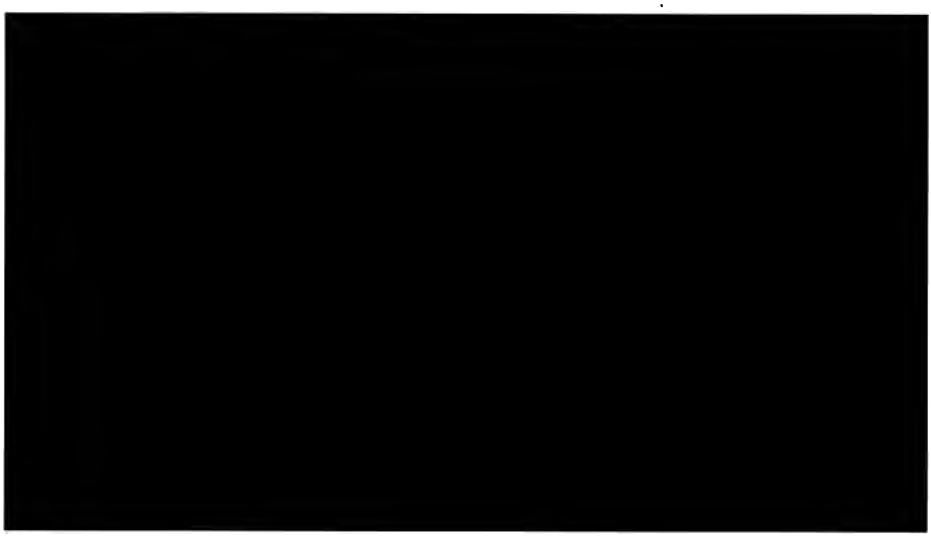
The strata that contain Belemnites are all above the New Red Sandstone; they are, the Lyas, the inferior or iron-shot Oolite, the Stonesfield Slate, the Oxford Clay and sandy Limestone above it; the Gault and mixtures of it with the Green-sand, and the lower and upper Chalk. It is to be remarked, that above the red marl there has not been seen a single straight-chambered shell with a central siphuncle; nor below the red marle a single one the apex of which is known to extend far beyond the apex of the chambered cavity. In the older formations the substance of the chambered shells is entirely changed into calcareous spar, the distinction between the tissues of their several coats being destroyed.

but it is because we have viewed the same facts in a light which seems to warrant us in drawing conclusions from them which may tend to combine the opinions of the two best authors upon the subject. The situation of the genus in a natural series is neatly pointed out by M. de Blainville; but the sections of the genus, at least the three first by him, and the separation of Actinocamax by Mr. Miller, are ill-founded, as will be shown hereafter. M. de Blainville places the genus Beloptera immediately after Sepia, next Belemnites, then Orthoceræ,—so commencing the long series of chambered shells, all of which are supposed to belong to cephalopodous Mollusca.

The genus Argonauta has long been included in the same series; but it by no means appears in its natural situation, and spoils the harmony, in whatever part it be introduced: it is in fact much nearer related to Carinaria. The question respecting the Ocythoë that is found in it, being a parasite or not, is still undecided; and we must be cautious when contemplating it, to avoid being led by the supposed analogy the shell bears to Nautilus,—an analogy which holds little further than in the name.

The fact that there is no surface of attachment between the animal found in it and the shell, that the animal is sometimes placed with the rectum over the beak of the shell and sometimes in the opposite direction, joined with the facility of quitting the shell the animal shows when captured, strongly favour the idea of its being a parasite; and when we contemplate the irregular form and size of the apex of the spire, we are led to conclude that the egg of the animal proper to the shell, must have been

much larger than any of the eggs that have been found to accompany the Ocythoë, in the proportion of at least a pea to a pin's head; Mr. Poli must therefore have been somehow deceived when he thought he saw the Argonauta developed in the eggs of Ocythoë. The probability is, that the Ocythoë chooses the shell of an Argonauta as a convenient protection for its spawn, because it is light and portable; and that the sac or mantle of Ocythoë in the egg has been taken for the shell. We think therefore there is good reason for removing Argonauta from the Cephalopoda to the Heteropoda, of which Order we take the present opportunity of mentioning, that we know of no fossil belonging to it.



BELEMNITES minimus.

TAB. DLXXXIX.—*fig.* 1.

SPEC. CHAR. Fusiform, squarish, expanded towards the apex, cylindrical towards the base; apex indistinctly papillose, each side marked with an obscure double furrow; base not expanded; a sulcus in the front extending a short way from the base.

SYN. Belemnites minimus. *Lister.*

B. Listeri. *Mantell, Geol. Suss. p.* 88. *tab.* 19. *fig.* 17. 18. & 23.

B. minimus. *Miller, Geol. Trans.* 2d series. *v.* II. *p.* 62. *pl.* IX. *f.* 6. *De Blainville, Mém. sur les Belemn.* 75. *pl.* IV. *f.* 1. and *p.* 119. *pl.* V. *f.* 5.

THIS small Belemnite is generally of a rather bright yellow brown colour, and possesses much transparency; its outer laminæ often show a tendency to flake off about the apex, and the axis is always opaque or tubular from decomposition, which shows that the imperfect state of the base, which has not only lost the septa that we suppose from analogy must once have existed within it, but also much of its fibrous portion, has arisen from its having remained in an exposed situation a long time before it was buried in its grave of clay or marl, which has preserved its remains for our inspection and admiration. So much indeed of the fibrous substance has decayed away from the surface of the conical cavity in many cases, that a considerable portion of the axis is

left projecting into it in the form of a tube. The length rarely exceeds two inches and a half.

It is peculiar to the Marl (blue marl, blue chalk marl or gault) between the upper and lower green-sands. The small specimens figured are from Folkstone. Mr. Goodhall has similar from Maulden and Clophill, and that vicinity, in Bedfordshire. We have others from Sussex and Cambridge. The large ones are from Speeton Cliff, Yorkshire, by favour of Mr. Williamson.

In Mr. Miller's figure two furrows are represented near the base: we have never seen such a specimen.

BELEMNITES attenuatus,

TAB. DLXXXIX.—*fig.* 2.

SPEC. CHAR. Subfusiform, squarish, not much diminished towards the base; suddenly contracted a little above the middle, whence to the rather blunt apex it is elongated and almost cylindrical; an obscure double furrow on each side, and a sulcus in the front extending a little way from the base.

THIS has a curious appearance, one third of it from the apex being more cylindrical and much narrower than

BELEMNITES pistilliformis.

TAB. DLXXXIX.—*fig.* 3.

SPEC. CHAR. Fusiform, pointed, round, very much attenuated and elongated towards the base.

SYN. B. pistilliformis. *De Blainville, Mém. sur les Belemn. p.* 98. *pl.* V. *f.* 14. 15. 16. & 17.

AN elegant but variable species; sometimes it is equally attenuated at both ends, at other times it is much thickest near the apex; the older individuals generally approach most towards cylindrical, and have an obtuse extremity. We are not quite certain that this is exactly the species described by De Blainville, because we find some traces of longitudinal furrows or impressions of veins. It is very possibly the young of B. elongatus.

The figures are all from specimens collected by our indefatigable friend H. H. Goodhall, Esq., out of the Lyas Clay at Shorne Cliff, east of Charmouth. De Blainville says it is from the Jura-Limestone.

BELEMNITES elongatus.

TAB. DXC.—*fig.* 1.

SPEC. CHAR. Slender, cylindrical in the middle, gradually expanding to a broad base one way, and tapering to a point the other; round, and free from furrows; the chambered cavity two-thirds the length of the shell.

SYN. B. elongatus. *Miller, Geol. Trans.* 2d series. *vol.* II. *p.* 60. *pl.* VII. *f.* 6. 7. & 8. *DeBlainville, Mém. sur les Belemn. p.* 95.

A Belemnite. *Joshua Platt, Phil. Trans. vol.* liv. *p.* 38 (*with a figure*).

A GREAT portion of the shell of this Belemnite is so thin as to give rise to the opinion that only part of the chambered cavity (the alveolus) is covered by the fibrous coat (guard or sheath); and that the last formed chamber, whose sides would principally consist of this coat, is not proportionally larger than the preceding one,—an opinion that has been formed from the examination of imperfect specimens, and influenced by the idea that the alveolus may be independent of the guard. The cylindrical portion of the shell extends for about one fourth of its length, and is over the extremity of the cavity. The diameter of the base when perfect nearly equals a

BELEMNITES abbreviatus.

TAB. DXC.—*figs.* 2. 3. & 9.

Spec. Char. Short, subcylindrical, with an expanded base; extremity suddenly tapering and slightly recurved to a blunt excentric apex; sides flattened; cavity about half the length of the shell, its apex far from central.

Syn. B. abbreviatus. *Miller, Geol. Trans.* 2d series. *p.* 59. *pl.* VII. *f.* 9. & 10. *De Blainville, Mém. sur les Belemn. p.* 91.

There appear to be no furrows upon any part of this shell; its thickness in proportion to its length, the contraction and curvature of its superior extremity, and the cavity inclining towards the front, are so many marks by which the species may be known.

Occurs in the Inferior or Ironshot Oolite (probably only in the lower beds), and the upper beds of Lyas.

Fig. 1. is from a Weymouth specimen: fig. 2. is from Banbury in Oxfordshire, by favour of the Rev. W. D. Conybeare; it is part of an alveolus, and shows how closely the inflated tubes of the siphuncle between the septa approach the surface of the cavity, which in fact cuts off a segment from each. Fig. 9. represents a young individual of precisely the same form, from near Bath: it is in Mr. Goodhall's cabinet.

The figure referred to by Miller in *Parkinson's Org. Remains*, does not decidedly represent this species.

BELEMNITES acutus.

TAB. DXC.—*figs.* 7. 8. & 10.

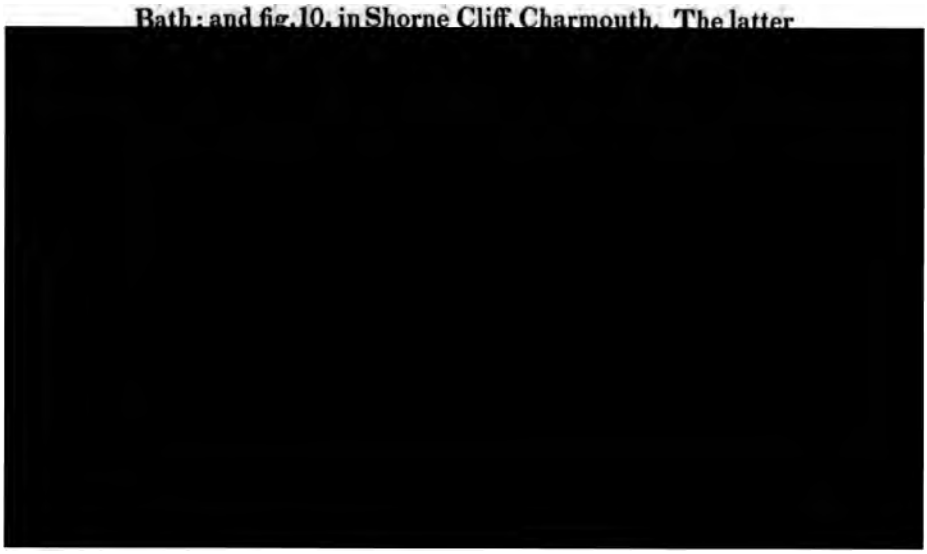
SPEC. CHAR. Conical, terminating in an acute point, round; cavity very deep, central.

SYN. B. acutus. *Miller, Geol. Trans.* 2d series. *vol.* II. *p.* 60. *pl.* VIII. *f.* 9.

A REGULARLY conical smooth shell; very slightly compressed on the sides, and without any furrow. From the great diameter of the cavity at the base, we judge it to be very deep.

B. acutus of De Blainville is certainly not the same species; that has a distinct longitudinal furrow, and is more cylindrical. M. De Blainville has probably been misled by Mr. Miller's having quoted, with a query, a figure in Luid that does not agree with his own.

Both our figures are taken from specimens in Mr. Goodhall's cabinet: fig. 7. was found at Weston, near Bath; and fig. 10. in Shorne Cliff, Charmouth. The latter



BELEMNITES penicillatus.

TAB. DXC.—*figs.* 5. & 6.

SPEC. CHAR. Short, compressed, very gradually tapering towards the superior extremity, near which it is suddenly contracted to an obtuse nearly central striated or sulcated obtuse point; cavity deep.

SYN. B. penicillatus. *De Blainville, Mém. sur les Belemn. p.* 89. *pl.* III. *f.* 7. *Knorr, part* 2. *pl.* I*. *f.* 1, 2. 3. & 4.

THE short compressed form and suddenly contracted extremity serve to distinguish this species by, although the furrowed or striated apex may be concealed, which it often is.

Found in Shorne Cliff by Mr. Goodhall, but by no means plentiful.

We strongly suspect B. brevis and B. penicillatus, and also B. digitalis, to be but varieties of one species.

BACULITES Faujasii.

TAB. DXCII.—*fig.* 1.

SPEC. CHAR. Smooth; section oval; sides compressed.

SYN. Ammonite droite. *Faujas, Hist. Nat. de la Mont. de St. Pierre,* 140. *pl.* 21. *f.* 2. & 3.
Baculites vertebralis. *Lam. Syst.* 103.
——— Faujasii. *Lam. Hist.* 7. 647.

BOTH edges of this species are equally rounded, and the sides a little compressed: there is no appearance of any kind of undulation upon the surface.

A cast in Chalk, figured from the collection of C. B. Rose, Esq.: it was found at Norwich. We have seen a larger specimen from Hamsey, in Mr. Goodhall's cabinet. It is very near B. ovata of Dr. Morton, in the Journ. of the Academy of Nat. Sciences of Philadelphia, vol. vi.; but we cannot trace any undulations upon the sides.

BACULITES obliquatus.

TAB. DXCII.—*figs.* 2. & 3.

SPEC. CHAR. Surface undulated; section oval; undulations oblique, annular, deepest at the margins.

SYN. Hamites baculoides. *Mantell, Geol. Suss. p.* 123. *t.* 23. *f.* 6. & 7.

THE very oblique undulations or furrows which pass all round the surface readily distinguish this species: they

HAMITES grandis.

TAB. DXCIII.—*fig.* 1.

SPEC. CHAR. Section circular; surface anteriorly undulated; undulations numerous, not deep, oblique; on each side are a few short, oblique ribs, enlarged at their extremities.

BETWEEN each rib, which only occupies a small portion of each side, are about six rounded furrows, that extend to the line beneath which the siphuncle lies: the posterior surface is smooth. The edges of the septa are formed into very acute and numerous intricate sinuses, arranged in six very unequal lobes.

Found in a quarry of Kentish Rag-stone (a calcareous bed in the Lower Green-sand), on the estate of E. Hughes, Esq. in the parish of Smeeth, near Hythe. We are indebted to Dr. Buckland for the use of the specimen.

HAMITES Gigas.

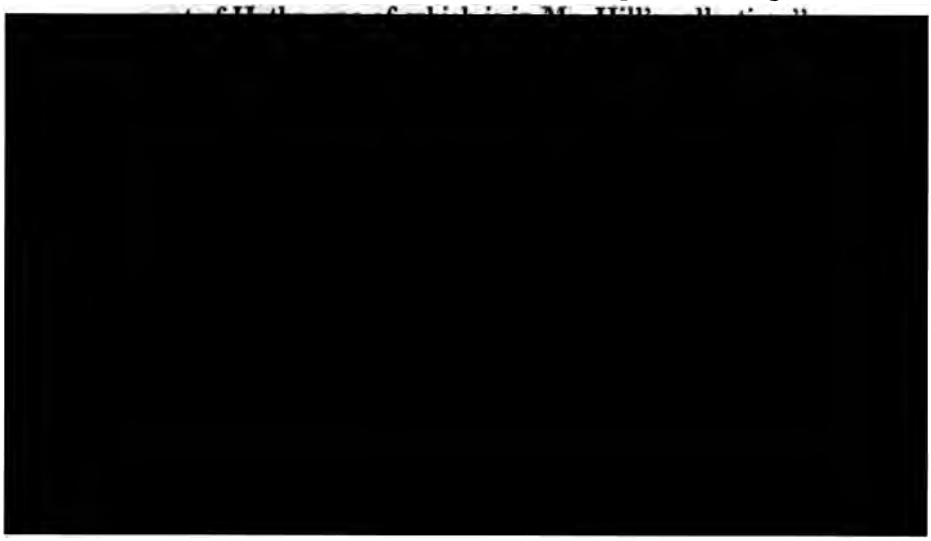
TAB. DXCIII.—*fig.* 2.

SPEC. CHAR. Largely ribbed; inner side plain, flattish; ribs composed of six laterally expanded tubercles.

A RATHER suddenly curved species: six blunt spines are united, three on a side, to form each oblique rib, which is nearly lost as it passes over the front; the spines near the front are largest; the section is rather square.

We have to acknowledge our obligations to the Right Honourable Lord Greenock, whose anxiety to render a service to Geology has induced him to lend us this and several other rare subjects from the Greensand formation near Sandgate.

"It occurred in the second or lower bed of Limestone, in its uppermost course of Rag and Clay above Seabrooke, between Sandgate and Hythe. Other specimens have been collected in the same stratum and bed, upon the Roughs



UNIO porrectus.

TAB. DXCIV.—*fig.* 1.

SPEC. CHAR. Subcylindrical, rather compressed, above twice as wide as long; anterior side very small, the other pointed.

THIS is the largest species of Unio found in the Sandstone of Tilgate Forest: it is distinguished by its regularly convex surface and pointed posterior extremity.

UNIO compressus.

TAB. DXCIV.—*fig.* 2.

SPEC. CHAR. Ovate, compressed; hinge-line bent; beaks rather prominent; lateral ridge square.

LENGTH and breadth in the proportion of 2 to 3: the hinge slope is flattened, so as to make the ridges that bound it square. The anterior side is as large as in the preceding species, although the other is much less.

A rare species, from Tilgate Forest.

UNIO antiquus.

TAB. DXCIV.—*figs.* 3. 4. & 5.

SPEC. CHAR. Transversely ovate, elongated, compressed; back and front nearly parallel and straight; anterior side small.

LENGTH half the width. The anterior side is larger in this than in U. porrectus, and the general form is more square. Fig. 3. exhibits the usual character of casts. Fig. 4. has the substance of the shell remaining, but converted into spar. Fig. 5. is from a cast that is more pointed than usual, and approaches to U. porrectus, of which it is even possible that it may be the young shell.

The commonest species in the Sandstone of Tilgate Forest in the Weald Clay.

UNIO aduncus.

TAB. DXCV.—*fig.* 2.

SPEC. CHAR. Wedge-shaped, gibbose, antiquated; anterior side straight, small; the opposite extremity more or less produced, truncated, and bent downwards; shell very thick.

UNIO cordiformis.

TAB. DXCV.—*fig.* 1.

SPEC. CHAR. Heart-shaped, posteriorly pointed; umbones inflated.

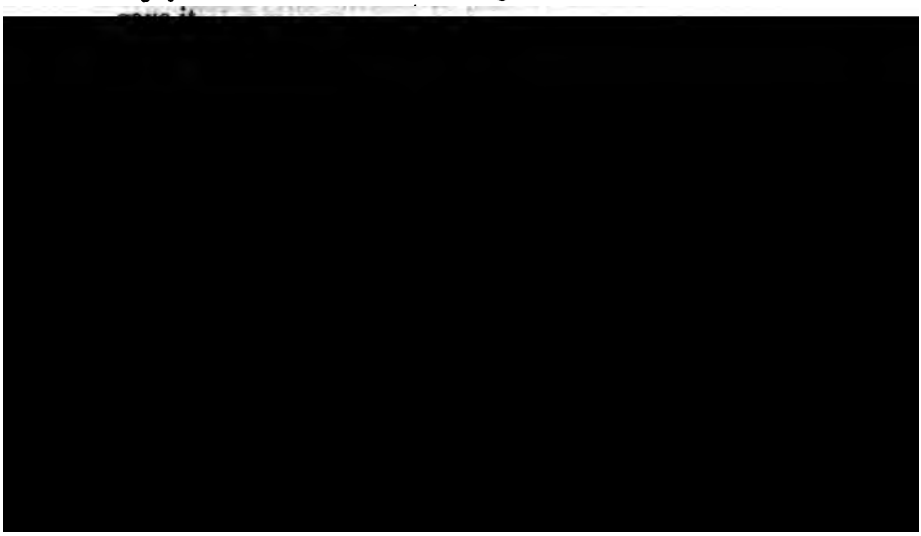
A THICK shell, whose length, width, and the united depth of the valves, are nearly equal. The anterior side is very small.

This is the rarest shell that occurs in the beds of Sandstone at Tilgate Forest, subordinate to the Weald Clay of Sussex.

We are under obligations to G. Mantell, Esq. for the loan or possession of the specimens figured in this and the preceding plates.

Much diversity of opinion exists regarding the propriety of arranging the shells given in these two tables in the genus Unio. They appear to be confined to certain Sandstone beds included in the Weald Clay; a formation that contains very few species of shells excepting oysters, and these referable to only three genera, Paludina, Cyclas, and Unio. In most cases the shells are firmly united to the stone, and only casts can in general be extracted, which renders it difficult to observe those parts by which the genera are clearly indicated, and lay a foundation for doubt. The genera above assumed are composed of freshwater shells; and from this it has been concluded that the formation they are found in is of freshwater origin, pro-

bably deposited in an extensive lake. This opinion is strengthened by the discovery of Cypris (see t. 485.) in some of the beds connected with the formation, while the presence of oysters excites much speculation. It has been justly observed, that the shells referred to Paludina (Vivipara, Min. Conch. t. 31.) are thicker than the recent species of that genus, and approach very near to Turbo littoreus; but the general form is nearer to Paludina fluviorum, and we have never been able to extract an individual with a perfect lip. The Cyclades have been better determined, the hinge having been freed from the stone (see t. 527.). The shells immediately under our consideration, although very abundant, are never very perfect: casts of their interior are most frequent; and they present strong indications of the deep muscular impressions, the laminated lateral tooth, and the large teeth in the hinge, characteristic of the genus Unio; so that we cannot choose but arrange them under that genus of freshwater shells; and although it must appear extraordinary to find oysters mixed with freshwater shells, or a freshwater formation between marine deposits, we must not, however praiseworthy it is to admire, lose ourselves in wonder, but steadily persevere in searching after the whole truth; for by so doing we shall best display the harmony that exists in all the works of Nature, and prove that we possess a mind open to conviction, the possession of which is an enjoyment we must ever feel grateful for to Him who



VERMETUS. *Lamarck, Hist. Nat.*

(*Vermicularia,* supra vol. i. p. 125.)

GEN. CHAR.* Shell tubular, in part spiral, fixed by its apex; operculum corneous, flat, attached to the foot of the cephalous animal.

IT is by the animal principally that the Vermetus (formerly called Vermicularia by Lamarck) is distinguished from Serpula and similar genera: it is formed by an animal not composed of joints, that has a distinct head, two tentaculæ, with an eye at the base of each, and a cylindrical foot (or analogous part) supporting a horny operculum, and consequently nearly related to the animals of true spiral shells, and belonging to Trachelepodous mollusca.

There does not appear to be any certain external character to distinguish the shell by; but the animal seems much less disposed to attach any large portion of its shell to foreign substances, and generally forms a tolerably regular and more or less open spire of the commencement of its tube, which is either discoid or conical. There can of course be no certainty respecting the fossil species; but as it is convenient to separate those shelly tubes which have hitherto been called Vermiculariæ, from among the Serpulæ, we shall still consider such as have been attached only by the apex (which, by the bye, form a very natural group) as belonging to the genus Vermetus. Most of the individuals turn one way, which, if the cone be placed in the same position, is found to be the reverse of most univalves.

* The generic character formerly given being inaccurate, and the observations upon it being founded partly in error, we wish to cancel them.

VERMETUS Bognoriensis.

TAB. DXCVI.—*figs.* 1. 2. & 3.

SPEC. CHAR. Spiral portion conical, subdiscoid, concave beneath; tube obscurely five-sided, with a furrow above and below; the produced part cylindrical, slightly curved.

SYN. Vermicularia Bognoriensis. *Mantell, Geol. Suss. p. 272.*

Serpula? *Parkinson, 3. 97. pl. 7. f. 8.*

THE tube of this is more angular, and the whorls more numerous, than in V. concava, t. 57. to which it nearly approaches; but when the surface is worn away, it appears cylindrical.

Very abundant in some parts of the Sandstone of the

VERMETUS tumidus.

TAB. DXCVI.—*fig.* 4.

SPEC. CHAR. Discoid; whorls few; tube thick, externally marked with a broad furrow on two sides; the produced part small, short, cylindrical; edge of the aperture thickened.

THE shell of this is so thick that it appears tumid just before the small cylindrical part of the tube that precedes the aperture: the whorls are seldom more than two, with a concentric furrow on each side, and a callus at the apex.

From the Coral Rag near Scarborough.

VERMETUS concinnus.

TAB. DXCVI.—*fig.* 5.

SPEC. CHAR. Discoid or slightly convex, a large portion of tube produced; tube five-angled, four angles acute, the fifth obscure.

A NEAT little shell: at first sight it seems to be a square tube, but upon close examination an obtuse angle is perceived round the margin of the disk.

Very abundant in a thin stratum of brown sandy Limestone in Robin Hood's Bay, said to be equivalent to the Inferior Oolite. We have received it from several correspondents.

VERMETUS polygonalis.

TAB. DXCVI.—*fig.* 6.

SPEC. CHAR. Spiral portion a short cone, with one involute ridge running up to the apex, and two ridges round the margin; produced part trumpet-formed, with seven acute angles.

THE ridge around the spire is erect and very prominent; the other ridges are less elevated, except near the expanded mouth, where they are equally prominent, and produced into short spines.

One of the specimens figured is from the Limestone, and the other from the Sand beneath it, both belonging to the Lower Greensand: they were found above Seabrooke, between Sandgate and Hythe, and are in the collection of Lord Greenock, who has liberally allowed them to travel to London.

SERPULA. *Linn.*

GEN. CHAR.* Shell tubular, variously curved, fixed by a considerable portion of one side; operculum corneous or shelly, pedunculated, attached to the anterior extremity of an articulated, acephalous animal, whose feathered branchiæ surround its mouth.

THE difficulty there always must be in distinguishing the four genera of Annelides that have shelly tubes, when we only have the means of examining the tubes deprived of their animals, has induced me to relinquish the attempt; neither does it appear to be of much importance, since the animals are very similar, and their habits the same.

The following are the four genera alluded to, which are distinguished by the characters attached. They may form subgenera.

Spirorbis. Shell curved into a discoid volute, attached by its lower flattened surface.

Animal furnished with six-pinnated branchiæ and a peltate operculum.

Obs. The shells are mostly minute, often produced beyond the convoluted part, and then irregularly curved.

Serpula. Shell irregularly contorted, fixed by a part of its side; aperture simple.

* The generic character given with tab. 30. not being sufficient, we add the present.

Animal furnished with two fan-shaped branchiæ, and a funnel or club-shaped corneous operculum.

Obs. The tubes often assume the same form as the preceding genus; they are generally larger, often very large in comparison.

Vermilia. Shell variously curved, attached by its side: one or more teeth occur upon the edge of the aperture.

Animal furnished with two fan-shaped branchiæ, and a shelly, simple, operculum.

Obs. One or more carinæ upon the tube being produced, form the teeth upon the margin of the aperture: these carinæ do not always extend to the aperture, and are sometimes wanting in a few individuals of the same species as those which have them (see S. ampullacea, tab. 597.). The operculum is sometimes conical, sometimes has a tricuspidate apex, and sometimes flat. Serpula crassa (tab. 30.) belongs to this genus, unless the concave radiated operculum would be sufficient to form a new one from.

Galeolaria. Shell variously curved, attached by its side; a spatulate process upon the edge of the aperture terminates a double keel along the back. Operculum shelly, concave; in its disk are inserted a num-

SERPULA ampullacea.

TAB. DXCVII.—*figs.* 1. 2. 3. 4. & 5.

Spec. Char. Thick, irregular, antiquated, with a globose enlargement near the entire aperture; more or less carinated upon the back; surface of attachment expanded, thickened.

Kentish Chalk Fossil, a Serpulite. *Parkinson*, 3. 94. *pl.* 7. *f.* 11.

A large thick species, varying in form according to the surface to which it fixed, often choosing a thin cylindrical substance, when it becomes discoid, with a perforation in the centre (figs. 2. 3. 4. & 5.). It has sometimes a carina extending its whole length (as in figs. 2. & 5.), sometimes only for a part of it (as in fig. 4.), and at other times scarcely to be discovered (figs. 1. & 3.). The surface is often marked with small undulating lines, that give it in parts a granulated appearance (figs. 1. 4. & 5.); other specimens are smooth (figs. 2. & 3.). All these varieties, when full grown, are considerably thickened before the aperture is finished; so that the extremity appears to be inflated, but the inside remains cylindrical.

Not unfrequent in Chalk, although hitherto almost unnoticed. All our figures are from the Norwich Chalk. No. 2. was presented to us by Mr. Barnes of Norwich; the others belong to the Rev. G. R. Leathes, whose favours we have so frequently had to acknowledge. We have a specimen from Northfleet resembling in form Mr. Parkinson's: it is to be distinguished from Vermetus by the surface of attachment which occupies one side of the disk and a great part of the tube beyond it.

SERPULA (VERMILIA ?) macropus.

TAB. DXCVII.—*fig.* 6.

SPEC. CHAR. Tube thick, slightly curved, rapidly increasing, triquetrous; aperture small, round, elevated by the thick mass that fixes the tube; front sulcated.

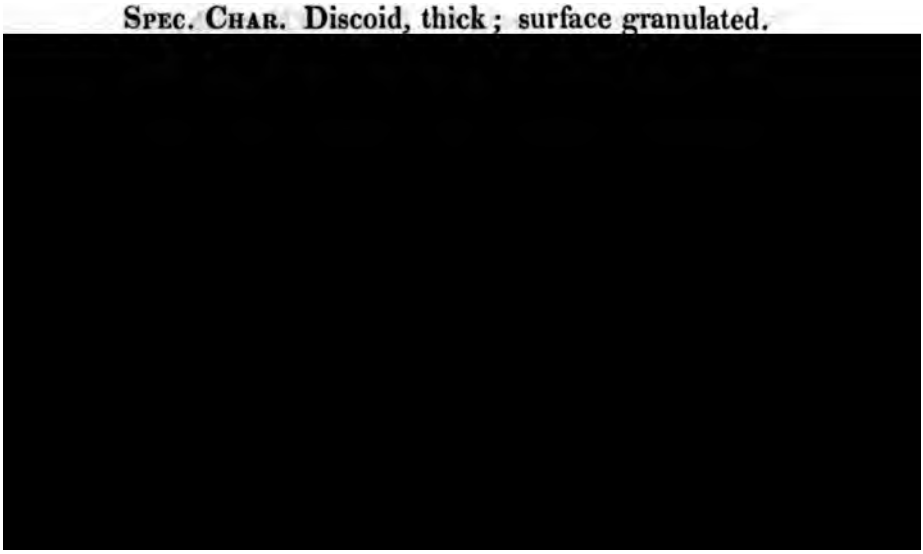
THE two free sides of this worm-shell are nearly flat; they have, however, sometimes a slight angle along the middle of each: the thick mass that elevates the aperture from the substance it is placed upon is so divided in front as to resemble two clumsy feet.

From the Norwich Chalk in the cabinet of the Rev. G. R. Leathes.

SERPULA (SPIRORBIS?) granulata.

TAB. DXCVII.—*figs.* 7. & 8.

SPEC. CHAR. Discoid, thick; surface granulated.



SERPULA Plexus.

TAB. DXCVIII.—*fig.* 1.

SPEC. CHAR. Cylindrical, smooth, very much curved, entangled into dense masses; diameter about half a line, diminishing very slowly from the aperture.

A COMMON species that occurs in compact masses in Chalk. We have it from Norfolk and Sussex. The masses are sometimes as large as one's fist, and composed wholly of numerous individuals of the same species.

SERPULA Carinella.

TAB. DXCVIII.—*fig.* 2.

SPEC. CHAR. Cylindrical, gradually tapering towards the apex, repent; with a minute carina upon the back gradually lost towards the aperture.

NEARLY a line in diameter, moderately tortuose and partially raised from the substance upon which it creeps.

Occurs in the Greensand. Our figure is taken from a Blackdown specimen, in which the shells are replaced by silex; they are fixed inside a Venus.

SERPULA compressa.

TAB. DXCVIII.—*fig.* 3.

SPEC. CHAR. Lanceolate, rather compressed, smooth; slightly tortuose; aperture elliptical.

LARGEST diameter four lines, rapidly diminishing; a large part of the tube is free.

From the great Limestone Strata which traverse in a northerly direction the county of Linlithgow, and constitute the independent Coal formation of the Lothians. Presented by the Rev. John Fleming, D.D. in 1814.

SERPULA antiquata.

TAB. DXCVIII.—*fig.* 4.

SPEC. CHAR. Cylindrical, partly attached by an expanded surface; surface uneven, with transverse irregular rings.

THE diameter is three or four lines, very slowly decreasing; the edge of the aperture is obtuse.

Casts in silex marked with the small rings peculiar to that substance, are common in the Greensand of Wiltshire.

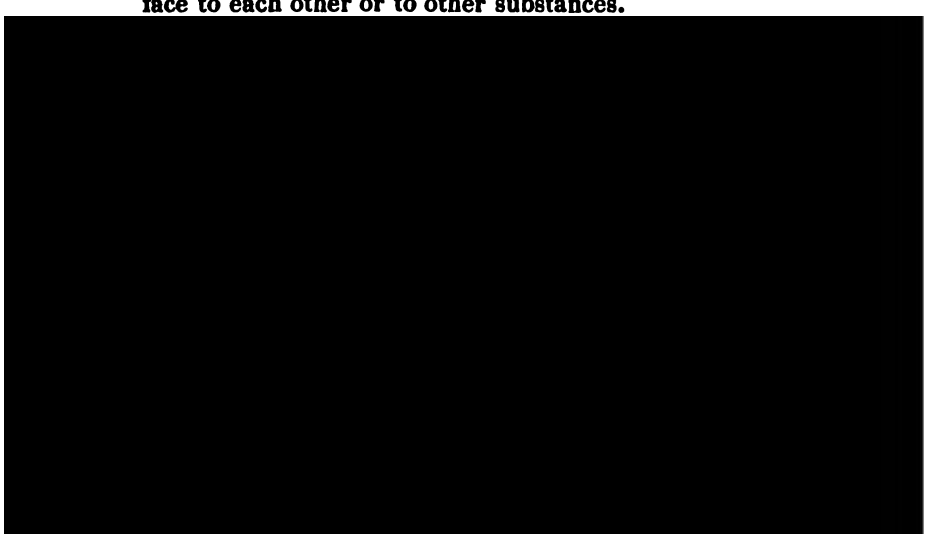
A small portion imbedded in clay, found in East Weare Bay near Folkstone by H. H. Goodhall, Esq., is added to the figures, as it appears to be the same species.

SERPULA tenuis.

TAB. DXCVIII.—*fig.* 5.

SPEC. CHAR. Cylindrical, with a minute carina upon the back, and a few distant sharp rings; shell thin.

A VERY small species occurring in little groups, and single individuals fixed by an expanded part of the surface to each other or to other substances.



SERPULA tetragona.

TAB. DXCIX.—*figs.* 1. & 2.

SPEC. CHAR. Tube very long and narrow; free for a great part of its length; externally four-sided, with prominent angles; aperture round.

ABOUT one line in diameter and several inches long, variously curved; the sides are equal, nearly flat.

This square Serpula is very abundant in blocks of marl that have been removed from the oolite, and scattered over various parts of the country. Our specimens are from Suffolk, and contain also Avicula inequivalvis, a Cardium, and Astarte elegans.

Fig. 2. represents a variety probably of the same species in Cornbrash Limestone, from Bedfordshire.

Serpula quadrangularis of Lamarck is probably a distinct species, perhaps even a Vermetus.

SERPULA rustica.

TAB. DXCIX.—*fig.* 3.

SPEC. CHAR. Tube externally four-angled, angles obtuse; as the tube increases, the angles are variously bent and interrupted, at length becoming irregular convexities arranged about a cylindrical tube.

NEARLY two lines in diameter and almost straight. The aperture is circular with a sharp edge.

Found in a light-coloured marl belonging to the Upper Greensand, at East Weare Bay, by H. H. Goodhall, Esq., in whose cabinet the specimen remains.

SERPULA articulata.

TAB. DXCIX.—*fig.* 4.

SPEC. CHAR. Externally square, furnished with rings, composed of four oval tubercles each, placed at remote irregular distances; angles rounded; aperture round.

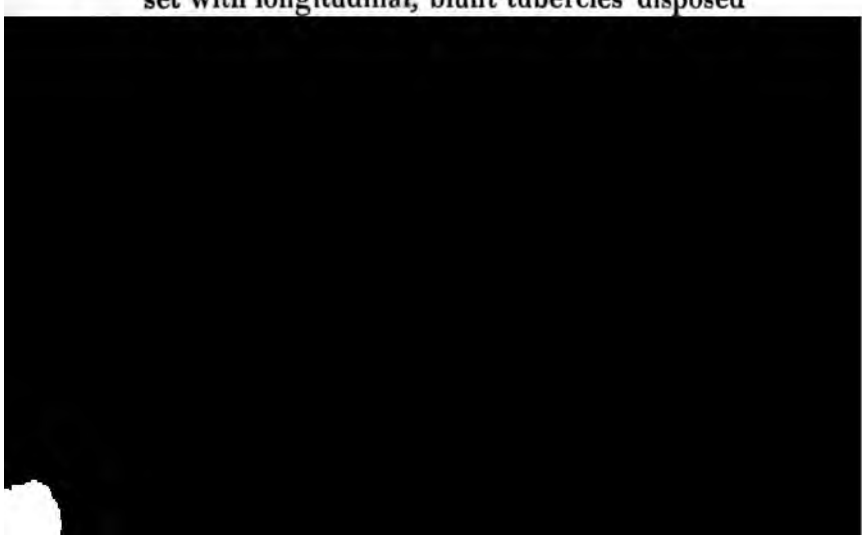
DIAMETER about two lines; there is no flat space between the ribs of which the angles are formed; these ribs are thickened into four oval tubercles each time the orbicular sharp-edged aperture is completed.

Found in coarse sandstone of the Upper Greensand near Folkstone.

SERPULA vertebralis.

TAB. DXCIX.—*fig.* 5.

SPEC. CHAR. Tube externally square, its angles set with longitudinal, blunt tubercles disposed



BELEMNITES mucronatus.

TAB. DC.—*figs.* 1. 2. 4. 6. & 7.

SPEC. CHAR. Subcylindrical, base expanded; the other end obtuse, with a central mucro; aperture nearly orbicular.

SYN. Belemnites mucronatus(*Schlottheim.*),*Brongn.* & *Cuvier Geol. des Env. de Paris,* 382. *Pl.* 3. *f.* 1. *De Blainville, Mem. sur les Belemnites,* 64. *Pl.* 1. *f.* 12.

B. electrinus, *Miller, Trans. Geol. Soc.* 2nd series, *vol.* 2. *part* 1. 61. *Pl.* 8. *f.* 18. 19. 20. 21. *Pl.* 9. *f.* 1. & 3.

B. coniformis? *Parkinson, Org. Remains, vol.* 3. *p.* 127. & 132. *Pl.* 8. *f.* 12. *Pl.* 9. *f.* 1.

Belemnite, *Faujas, Maestricht.* 178. *Pl.* 32. *f.* 3.

Actinocamax verus. *Miller, Trans. Geol. Soc.* 2nd series, *vol.* 2. *part* 1. 64. *Pl.* 9. *f.* 17. 18.

B. Scaniæ, B. Œsterfieldi, & B. quadratus? *Blainville,* 61. & 62. *Pl.* 1. *f.* 7. 8. & 9.

THE otherwise cylindrical form of this Belemnite is destroyed by a slight contraction towards the expanded base, and by a rather sudden decrease to the mucronated apex; along the front of the expanded portion is a furrow communicating with the conical internal cavity; on each side of the back is a flat space extending nearly the whole length of the shell; numerous ramified channels diverge from these spaces round the sides and meet upon the front, or enter the furrow above mentioned. We have never seen any septa in the conical cavity, which is very deep, but only circles indicating their edges, and a furrow along the back, besides the fissure in the front. Length about four inches, greatest diameter

nearly three quarters of an inch, cavity one inch and three quarters deep.

We have ventured to arrange under one specific appellation, Mr. Miller's Belemnites electrinus and Actinocamax verus, and almost all the species of the second and third of M. de Blainville's sections of the genus. The B. plenus, which forms the first section, and which M. de Blainville confounds with Actinocamax verus, is a distinct species, rather fusiform, gradually tapering to a point, and not mucronated nor marked with what appear like the impressions of veins upon its surface: we have not seen a specimen of which we know the locality, but possess two very good ones that appear to have been imbedded in clay. The form of the base, which has led Mr. Miller to separate the Actinocamax, and M. de Blainville the two first sections of the genus from one species, is to be explained as follows. When the shell, upon the death of the animal, sunk from its native element into the mud, the thin sides of its conical cavity were soon worn away; the two surfaces being both exposed and worn, the cavity was gradually shortened, as we find it in Blainville's second section, where in some cases a portion of the fissure still remains, the same action continuing until the cavity had entirely disappeared, one surface alone remained to be acted upon, which was rendered first flat and thin, in consequence of the edges being most worn, then convex or conical as in the Actinocamax. Small individuals are most subject to this complete metamorphosis, because in them it would much sooner take place under the same circumstances. The base is either oval or triangular, or perhaps even squarish, according to the part of the tube of which it is the section, and the depth of the vein-like impressions that

speaks of the alveolus: circles in the direction of their edges are figured by M. Brongniart; and we have specimens that prove the accuracy of his figure, but they show no projections. The ramose impressions upon the surface and entering the fissure indicate an internal shell; this circumstance and the absence of septa would be sufficient grounds for placing this and one or two other species together as a distinct genus from the Belemnites with chambered alveoli, provided we could ascertain the latter character; but in all probability the want of septa is accidental.

This mucronated Belemnite is a constant inmate of the upper beds of chalk in all countries. The specimens represented figs. 1. 2. & 4. are from Norwich. Fig. 1. shows a peculiar asperity about the pointed extremity. Fig. 2. a small specimen, with part of a Gryphæa globosa attached to it. Fig. 4. a section, such as is easily obtained by fracture. Fig. 6. the variety called Actinocamax verus. Fig. 7. a young individual from Margate.

We have a specimen considerably larger than fig. 1.

Some specimens are coated with silex, and even penetrated in parts by it.

We have specimens from the hardened chalk of the North of Ireland.

BELEMNITES granulatus.

TAB. DC.—*figs.* 3. & 5.

Spec. Char. Subcylindrical; apex obtuse, mucronated; surface granulated.

Syn. Belemnites granulatus. (*De France*) *Blainville*, 63. *pl.* 1. *f.* 10.

The form of this shell (we have not seen the expanded base) is precisely the same as that of B. mucronatus; it

has also similar impressions of veins, the granulated surfaces of the lamina it is composed of alone distinguish it.

Of this species we have seen three individuals; one from Bridgwick Pit near Lewes, and another from Andover, both collected by H. H. Goodhall, Esq.; one of them shows the reticulated structure exposed by decomposition, the other the worn base in its progress towards Actinocamax: the third is in Mr. Mantell's collection. We have shown a view of its base at fig. 5.

This species occurs also in St. Peter's Mountain, near Maestricht.

BELEMNITES lanceolatus.

TAB. DC.—*figs.* 8. & 9.

SPEC. CHAR. Subfusiform, much elongated, gradually tapering to a point, an obscure double furrow on each side, base obscurely triangular.

A MUCH more elongated shell than B. plenus, which it much resembles; its base is but slightly expanded, the surface smooth; length three inches and a half, diameter four lines.

G. Mantell, Esq. has kindly lent us one, and H. H. Goodhall, Esq. another specimen of this elegantly shaped Belemnite: they are both from Hamsey: the

HINNITES. *De France.*

GEN. CHAR. An unequal-valved, nearly equal-sided, radiated, bivalve; valves eared, the area of the hinge quadrangular, tripartite, its cartilage immersed in a deep longitudinal pit in the centre, the lateral portions striated, supporting the ligament; sinus for the byssus small; muscular impression large, connected with impressions remaining from the attachment of the mantle parallel to the margin of the valves.

A GENUS established by M. de France, who has described two fossil species. Mr. Gray has added one recent one from the British Museum; and three others have been added by my brother and M. des Hayes, the last of which is the Pecten Pusio of authors. All the species are more or less muricated upon the surface, and when advanced in age, employ the squamæ of the most convex valves to attach them to foreign substances. This habit and the peculiar form of the hinge pit, distinguish them from Pecten and Lima; the form of the hinge, especially of the fossil species, approaches near that of Ostrea, but the shell does not appear to be attached in the young state, nor constantly when old; and when it is attached, it is by the right valve, which is the most convex, not the left as in Ostrea.

It has been supposed that the attachment is caused by the pressure against the sides of holes in which the shells have been confined; but it rather appears to us to be the effect of choice on the part of the animal, for it is constantly the right valve that is attached; and the surface of the other, although they are both distorted, is not rendered smooth nor indeed changed, as it would necessarily be if confined. We possess a specimen of H. Cortesyi that seems to set the question at rest; it consists of two convex valves, one attached by almost its whole outer surface (even the ears) to the inside of the other, which does not show any marks of having ever been fixed. The animal is distinguished from that of the Oyster by having its mantle attached to the shell, as is

proved by the impressions within the valves; and by a byssus, for which there is a sinus under the anterior ear. It is probable that when the byssus is by any accident lost, or when the shell becomes too heavy to be conveniently retained by it, resort is had to the expedient of fixing the shell by spreading the squamæ, as they are formed at the edges, upon any neighbouring substance.

The fossil species belong apparently to the Crag, or a deposit immediately succeeding to the London Clay.

HINNITES Dubuissoni.

TAB. DCI.

SPEC. CHAR. Shell rather thick, oblong; right valve covered with concentric circles, the other charged with elevated rays, which are imbricated near the margin.

SYN. Hinnites Dubuissoni. *De France, Dictionaire des Sciences Naturelles*, 21. 170. *Des Hayes, Dict. Classique d'Hist. Nat.* 201. *Gray, Annals of Phil.* new series, 12. 104. *G. B. Sowerby, Zool. Journal*, 3. 70.

THE left valve is flat, ovate, the hinge and ears produced, the surface marked with many irregular elevated thin rays, which towards the margin are elevated into numerous semicylindrical scales. We have not seen the other valve. It is described as convex, with only concentric lines that mark the successive additions to the shell, and not fimbriated as in the H. Cortesyi, the other

PANOPÆA. *Menard.*

GEN. CHAR. An equal-valved transverse bivalve; sides unequally gaping; one hinge tooth in each; hinge ligament external supported by a thick prominent fulcrum in each valve.

A WELL defined genus, formed of the Mya glycimeris of Linneus. Only one recent species is known; it is a large heavy shell that inhabits the Mediterranean Sea. The thick rudely formed hinge with only one tooth in each valve, and that even disappearing by age, the external short ligament and gaping sides, are strong characters of the genus. There are several fossil species, but hitherto only one has been recorded by authors; it is found in Italy along with fossils of the same, or nearly the same, æra as those of the London Clay. The other fossil species have been published in Min. Conchology under Mya and Lutraria, but recent examinations have shown that they are Panopææ; they are the following:

Lutraria gibbosa, tab. 42.

Mya intermedia, tab. 76. & 419. f. 2.

Mya plicata, tab. 419. f. 3.

We are indebted to Mr. Gray of the British Museum for pointing out the propriety of placing the first of these under this genus.

PANOPÆA Faujas.

TAB. DCII.

SPEC. CHAR. Transversely oblong, elongated, subcylindrical; posteriorly truncate; anteriorly cuneiform, slightly gaping; shell thin.

SYN. Panopæa Faujas. *Menard de la Groye, Annales du Museum, vol. 9. p. 131. t. 12. Brocchi, 2. 532. Lam. Hist. Nat. 5. 457.*

THIS differs from the recent species (P. Aldrovandi) in being less obliquely truncated at the anterior side, in being more regularly cylindrical, and in being thinner.

A sandy mass of indurated marl replete with fragments of shells apparently from the London Clay formation found lying upon the coast near Lowestoft in Suffolk, by Dawson Turner, Esq., contained several fragments of this celebrated shell. Figs. 1. & 2. represent two of these fragments.

The Crag near Ipswich also contains fragments of the Panopæa Faujas, as well as of P. (Mya) intermedia. Figs. 3. & 5. are of the first species; in one of them a large pearl has been formed. Fig. 4. is probably a portion of the intermedia.

Panopæa Faujas is one of the Italian shells that has

PHOLAS ? compressa.

TAB. DCIII.

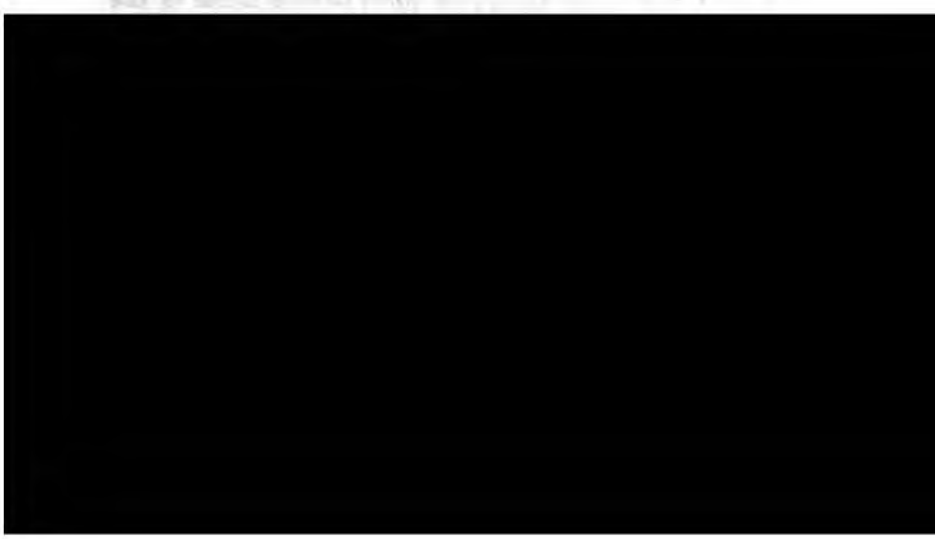
SPEC. CHAR. Transversely obovate, compressed; sides deeper than the middle; extremities gaping; along the middle of one valve is a rounded ridge, and a corresponding furrow in the other; surface marked with many sharp concentric ridges crossed by eight or ten others, equally sharp, upon the anterior side.

THE base is rather angular, the ridges thin, distant, bent in the middle of the valve; the whole surface is longitudinally striated.

An intermediate shell between Pholas candida and P. crispata, since the valves gape at the sides but have no sinus in the margin: in its flattened form and prominent beaks it differs from all the species of Pholas we are acquainted with; it is not without some hesitation therefore that we place it under that genus.

The specimen is a cast of the inside of the shell; it was broken out of an indurated Marl nodule found in the Kimmeridge Clay upon Shotover Hill by our valued friend G. E. Smith, Esq.

We take this opportunity to acknowledge an error in the description of Pholas priscus, p. 158. where we observe "the genus Pholas was unknown;" forgetting that M. des Hayes had described several species from the Paris Basin.



INOCERAMUS pictus.

TAB. DCIV.—*fig.* 1.

SPEC. CHAR. Oblong, convex, wavy, nearly covered by small concentric furrows; anterior side flattish, smooth; valves equal.

INTERMEDIATE between I. Brongniarti, t. 441. and I. striatus, t. 582. It resembles the first in length and the smoothness of the anterior side, its surface is furrowed like the latter, (which by the by the I. Brongniarti is obscurely,) but it is flatter than either. The most remarkable circumstance attending it is, that it is marked with broad stripes of a brown colour.

Of this extraordinary shell we have seen but one specimen, for the use of which we are indebted to our very scientific and liberal friend Mrs. Murchison. It was found in the Chalk Marl at Guildford.

INOCERAMUS digitatus.

TAB. DCIV.—*f.* 2.

SPEC. CHAR. Longitudinally furrowed; furrows large, round, equal to the ribs between them.

MANY large round ribs and intermediate equal furrows crossed by the lines of growth distinguish this gigantic shell.

Only small fragments of this species, which appears to exceed in size even the I. Cuvieri, have come under

our observation. They are mostly upon the surface of large gravel Flints among diluvium derived from the Chalk. The figured specimen still retains the shell and a portion of chalk adhering to it.

EXOGYRA. *Say.*

GEN. CHAR. An unequal valved, unequal sided, attached bivalve; umbones spirally curved to one side; hinge pit curved, nearly linear; an obtuse tooth in the flat, free valve, fits into a cavity parallel with the hinge pit in the convex, attached valve; one muscular impression in each valve.

A GENUS established by Mr. Say of Philadelphia* upon good grounds;—we say established by Mr. Say, for the imperfect indications given by Faujas† and Lamarck‡, (who, seeing but one valve of one species, considered it an univalve shell, and named it Planospirites ostracina,) had been abandoned. It is well distinguished from Ostrea by its impressed lateral spire and the consequent linear form of the hinge pit, and by the parallel furrow in the attached valve which receives the obtuse, compressed, sometimes striated tooth of the other valve. This tooth is an enlargement of that part of one of the edges which is often crenated in Oysters. It is distinguished from Gryphæa by the same characters of the hinge, by the spire being impressed, laterally curved, and very apparent in the flat valve, and further by the absence of the lobe that forms the distinction between Gryphæa and Ostrea. In its general structure it resembles Ostrea,

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* Described by him in the Amer. Journ. of Sci. and Arts, vol. ii. p. 43.

† Faujas, Maestricht, p. 145. Rastellum is a name that has been applied to some species; and Faujas has proposed to separate them and Gryphæa from Ostreæ, but this name is not applicable.

‡ Lam. Syst. 400. This species is very large and smooth, nearly related to Ex. haliotoidea; but we have only one valve, which however shows both sides, thus displaying the hinge and muscular impression.

being composed of laminæ whose edges rise successively in more or less elevated scales upon the surface. Like Gryphæa it is sometimes attached only by the apex of the convex valve, and is free when full grown; and sometimes by a large part of its surface. Some species are ribbed, but irregularly, like oysters.

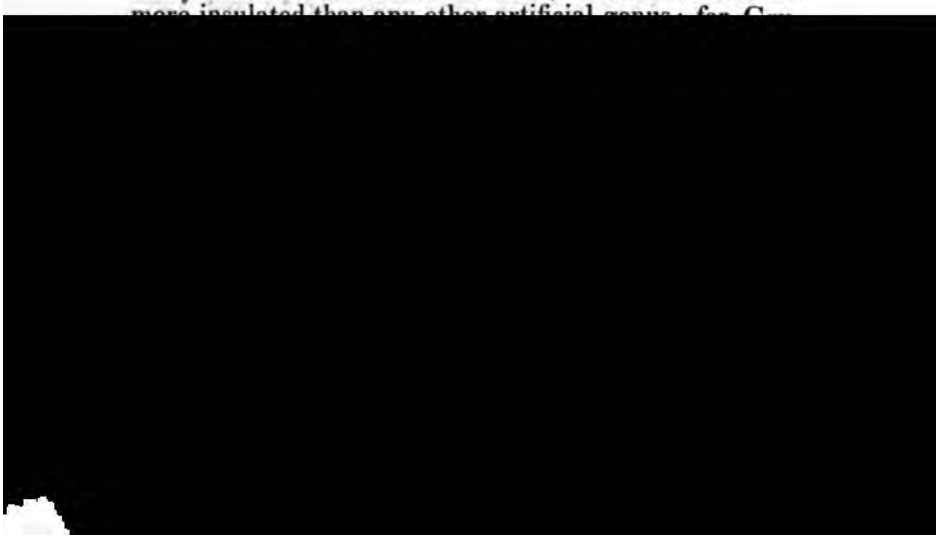
The mistake under which several shells that might better have been called Gryphææ were published in the first volume of Mineral Conchology as Chamæ, seems to have arisen from considering the tooth in the hinge without taking into account the muscular impressions, which in Chama are two. This important tooth seems to have been overlooked by Say, although he mentions the cavity or furrow that receives it. In the sixth volume of the Journal of the Acad. of Nat. Sciences of Philadelphia, Dr. Morton, when describing the Exogyra costata of America, has rightly referred the Chama haliotoidea, (Min. Conch. t. 25.) to the same genus, and discovers the mistake above alluded to; but is rather hard upon English Conchologists, in supposing that they join in the blunder.

The shells formerly published in Min. Conch. that should be arranged under this genus, are

Chama haliotoidea, tab. 25.*
——— recurvata tab. 26. f. 2.
——— conica tab. 26. f. 3.
——— plicata tab. 26. f. 4.
——— digitata tab. 174.

Chama canaliculata tab. 26. is a Gryphæa.

Thus far it appears that the genus Exogyra is bounded by distinct lines of demarcation; but in fact it is no



Exogyræ appear confined principally to the Green-sand formation: but as we do not know that the American species Ex. costata has ever been found in Europe, it is going too far to consider that as a proof of the identity of the beds in which it occurs with our Green-sand. The smooth varieties of it which are said to resemble the G. haliotoidea of Min. Conch. we have not seen; but it probably is that species: if so, the consideration of it with Gryphæa convexa of Mr. Vanuxem and Dr. Morton, (which is G. globosa of Min. Conch. and Podopsis Gryphæoides of the French, and occurs in Green-sand as well as Chalk,) Baculites and other shells, will go far to prove what those gentlemen have suggested, that the beds in which these shells occur are the equivalents of the Green-sand and Chalk formations of Europe; and we see no reason why different remote districts of the same formation and period should not, like the present surface of the globe, be furnished with different shells, as well as vary in the proportions, arrangement and mineral characters, of its several members.

EXOGYRA conica.

TAB. DCV.—*figs.* 1. 2. & 3.

Spec. Char. Smooth; deep valve more or less gibbose, curved, obtusely keeled along the middle; flat valve suborbicular, its beak impressed, very much incurved.

Syn. Chamæ conica, recurvata, et plicata. *Min. Conch. vol.* 1. *p.* 69, 70. *t.* 26. *f.* 2. 3. & 4.

The short, almost orbicular flat valve and small size, rarely exceeding an inch and a half, are the principal marks by which to distinguish this from the following species. The nearly central keel will also assist.

The small wings mentioned in the descriptions in vol. i.

are accidental, being produced by the form of the substance or shell that the individuals were attached to when young. We have found it proper to refer all three to one species, and retained the name *conica* as being the best of the three.

We have specimens from Folkstone, Parham Park, Chute Farm, Warminster, and Blackdown; those from the latter place are selected for the present figures.

The necessity of removing this fossil from the genus Chama has induced us to take it again under consideration.

EXOGYRA lævigata.

TAB. DCV.—*fig.* 4.

SPEC. CHAR. Elongated, curved, smooth; deep valve rather gibbose, obtusely keeled; keel near the hollow side; flat valve semicircular, pointed, its beak small.

NEARLY double the size of the last, also more elongated and curved with proportionally smaller beaks.

The figures are from Irish specimens in a compact sandy limestone, from the Green-sand formation. We have seen English ones very similar.

EXOGYRA undata.

POLLICIPES. *Leach.*

GEN. CHAR. Shell multivalved, laterally compressed, supported by a squamiferous peduncle; the five upper valves largest, the lower diminishing in size as they increase in number; apices of the valves free, pointed.

THIS genus is distinguished from other cirripodous Mollusca by the squamiferous peduncle, the slightly curved lanceolate dorsal valve, the continued succession of small valves diminishing in size towards the peduncle, and the free points of all the valves. The most common recent species, P. Cornucopiæ, occurs in the Mediterranean in clusters attached to shells, &c. We have given a small figure of it.

POLLICIPES sulcatus.

TAB. DCVI.—*figs.* 1. 2. & 7.

SPEC. CHAR. Valves marked with longitudinal, elevated striæ.

THE central or terminal valve (fig. 1.) is elongated, rhomboidal; the posterior valve (fig. 2. & 7.) is arched, broad, lanceolate and subcarinated; both are marked with irregular, sharply elevated, longitudinal striæ: we have not recognized the other valves.

An inhabitant of the Upper Chalk at Norwich, Maidstone, and Northfleet.

POLLICIPES maximus.

TAB. DCVI.—*figs.* 3—6.

SPEC. CHAR. Terminal valves rhomboidal plane, except sometimes a central ridge, and lines of growth; posterior valve arched, lanceolate, much elongated.

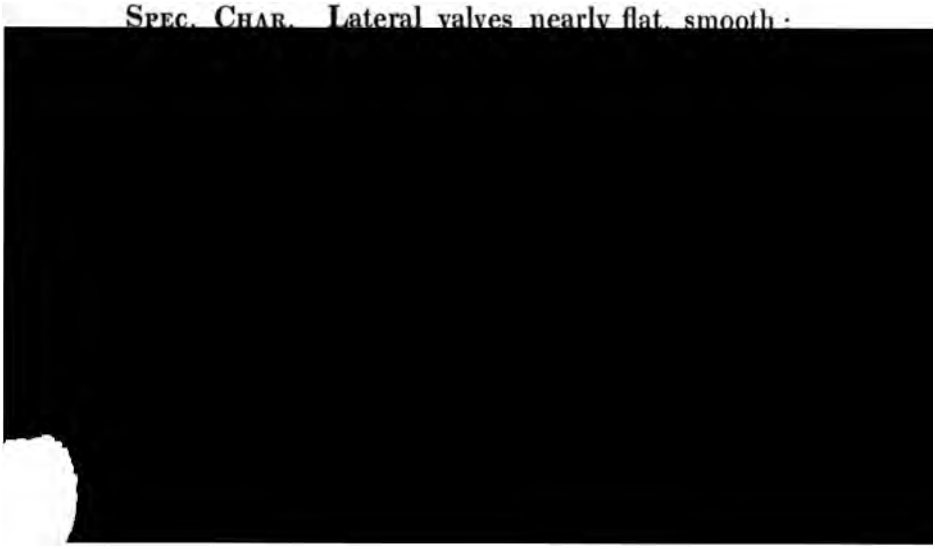
This differs from the last in the narrowness of the posterior valve (fig. 4.), and smoothness of the terminal valve which in old valves (fig. 3.) has a furrow along its middle in place of a ridge (fig. 5.); the anterior valve (fig. 6.) is hooked and has an obtuse keel. We are not acquainted with any other valves; and in this limited state of our knowledge, we must confess that it is with some degree of hesitation we declare these two species as distinct from each other.

From the Upper Chalk, collected by Mr. Barnes at Norwich. The posterior valve (fig. 4.) is from Northfleet.

POLLICIPES reflexus.

TAB. DCVI.—*fig.* 8.

SPEC. CHAR. Lateral valves nearly flat, smooth;



PILEOPSIS.—*Lamarck.*

GEN. CHAR. Shell a recurved cone covering the animal; the apex turned backward and to the right, minute, involute; muscular impression posterior, arched, its extremities dilated.

A GENUS formerly included under Patella, now evidently well separated from it, even if only its own characters independent of those of its animal be considered: but when the situation of the branchiæ in a distinct cavity near the head, and the connection of the mantle with the shell are observed, no doubt can be entertained. It is more difficult to distinguish Hipponix from it when the secondary valve (or support as M. De France calls it) of that genus is absent: indeed Lamarck has made Hipponix only a section of the genus Pileopsis; the form and position of the apex seem to indicate a difference.

Patella Unguis (t. 139. f. 7. & 8.) belongs to this genus. There are also two or three recent species known; one, P. ungarica, is British, it is covered with a fringed epidermis.

The Fossil species are only in the oldest and newest conchiferous formations.

PILEOPSIS vetusta.

TAB. DCVII.—*figs.* 1. 2. & 3.

SPEC. CHAR. Smooth, contracted posteriorly; two or three irregular undulations rise up the front; margin sinuose.

THE sides of this shell being rather flattened, the ovate

aperture is longitudinal, it is broadest at the front; the shell is moderately thick.

Not very unfrequent in the black limestone of Queen's County Ireland (fig. 1.), and Preston in Lancashire (fig. 2. & 3.) From the latter place we have been presented with several specimens by William Gilbertson, Esq.

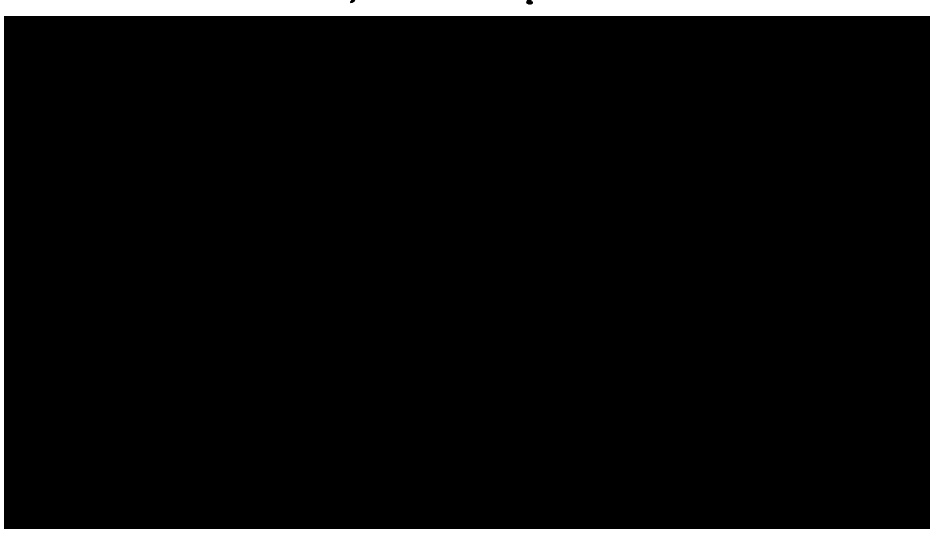
PILEOPSIS tubifer.

TAB. DCVII.—*fig.* 4.

SPEC. CHAR. Front surmounted by three rows of long tubes.

MUCH like the last but rather taller, the three rows of tubes are placed upon obscure ridges that run up the front, they equal the diameter of the aperture in length.

The specimen figured is in the rich cabinet of W. Gilbertson, Esq. We have seen only one other, which is smaller, but exhibits the bases of the three rows of spines very neatly: it is in the possession of Dr. Alexander Moore of Preston, from which place both individuals



SERPULA (Vermilia?) sulcata.

TAB. DCVIII.—*figs.* 1. & 2.

SPEC. CHAR. Repent, much elevated; back and sides flattened; along the centre of the back an irregular thick keel, and along each side a narrow sulcus; lines of growth conspicuous.

THIS Serpula seems composed of reflected scales placed in close succession, they are blunt and irregular; the aperture is round with a single tooth proceeding from the dorsal keel. It acquires the size of a swan's quill. The lateral grooves form a prominent mark of distinction.

Abundant in the Calcareous Grit at Shotover Hill near Oxford. Part of a specimen presented by G. E. Smith, Esq. is represented at fig. 1. It is chiefly composed of Silex. Fig. 2. has more of the Shell remaining. Some specimens have small pores between the laminæ.

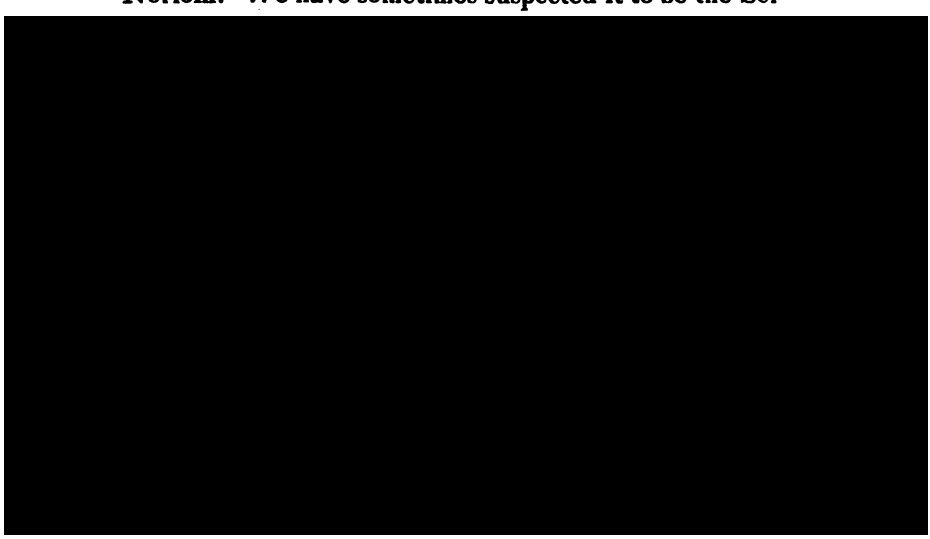
SERPULA tricarinata.

TAB. DCVIII.—*figs. 3. & 4.*

SPEC. CHAR. Repent, rather smooth, but sometimes when old squamose, round, with three thick keels, the central one largest; keels entire, sometimes disappearing. Aperture round with two thick lobes at the base, the edge thin.

SELDOM so thick as a goose quill, tapering rather quickly, the surface of attachment is expanded until the shell is old, when the last portions are nearly cylindrical and often free from keels, its surface is then squamose. Among the squamæ in such individuals, or between the lines of growth in others, there are frequently minute pores or short tubes, but whether formed by the animal of the Serpula or some minute one is not easily discovered.

The specimens figured are from the Calcareous Grit of Shotover Hill. We have others, that appear precisely the same, from the Coral Rag at Steeple Ashton, and from the Cornbrash of Felmersham, the latter collected by the Rev. T. O. Marsh: it is also found in the Diluvium of Norfolk. We have sometimes suspected it to be the Ser-



SERPULA triangulata.

TAB. DCVIII.—*fig.* 7.

SPEC. CHAR. Repent, roundish, elevated, smooth, three angles upon the back, the central one elevated into a keel; lines of growth circular.

A MUCH smaller and more cylindrical shell than the last, which it very nearly approaches; indeed there are upon the same mass of Stone several individuals so near S. tricarinata that, except in size, we cannot detect a difference.

Brought from Bradford, Wiltshire. Upon the same surface are two other species of Serpula, an Exogyra? and portions of the Pear Encrinite.

SERPULA runcinata.

TAB. DCVIII.—*fig.* 6.

SPEC. CHAR. Repent, subtriangular, with three distinct serrated or lacerated keels upon its back; aperture round.

LESS than a crow's quill, tortuose, with an expanded base; the back is round, with a central and two lateral keels, the latter are particularly sharp and lacerated.

Upon an unnamed Plicatula, attached to a mass of Coral from the Coral Rag of Shotover Hill: the upper figure is magnified.

SERPULA obtusa.

TAB. DCVIII.—*fig.* 8.

SPEC. CHAR. Repent, smooth, obtusely quadrangular, with an obtuse thick keel along the flat back; edge of the aperture produced as a short cylinder beyond a bilobed thick margin; base expanded.

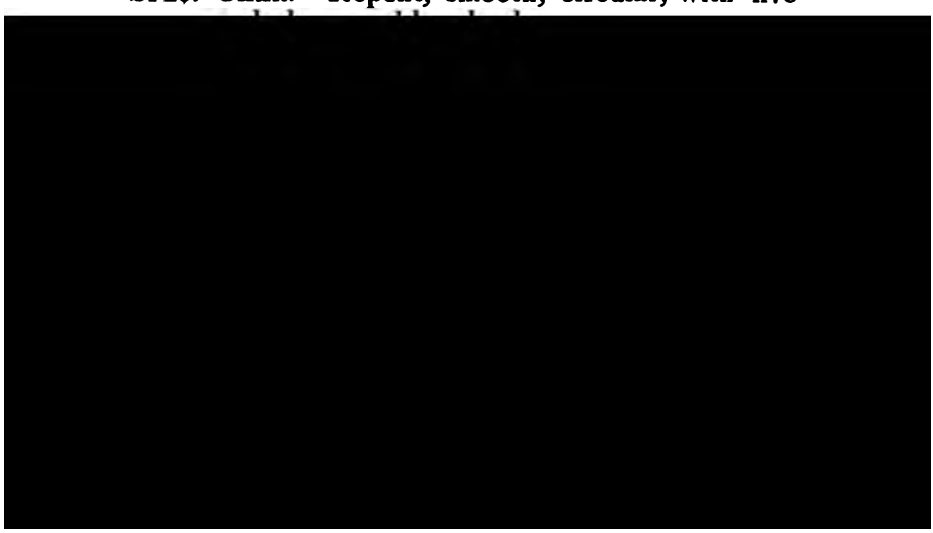
ALMOST as thick as a goose quill; when young the aperture has a tooth at top, and when nearly full grown the edge is much thickened by two reflected variciform lobes, that meet upon this tooth; when quite perfect, a short cylinder projects beyond these lobes. The surface is remarkably smooth, the lines of growth very indistinct; the keel is sometimes wavy and sometimes even.

A beautiful group of this Serpula upon a portion of an Inoceramus, from part of which the figure is copied, is in the rich collection of C. B. Rose, Esq., it is from the Upper Chalk of Sayham in Norfolk.

SERPULA fluctuata.

TAB. DCVIII.—*fig.* 5.

SPEC. CHAR. Repent, smooth, circular, with five



RISSOA. *Freminville & Desmarest**.

GEN. CHAR. Shell univalved, spiral, oblong or turreted, not umbilicated, often costated; aperture entire, oval, oblique, dilated, rather angular above and with a slight sinus at the base; lips nearly united, the outer thickened, its edge not reflected. Operculum shelly.

UNDER this genus are included a number of small elegant marine Shells, many of which are ribbed, especially in the young state, while some are nearly plain; the outer lip being thickened more than the costæ, but not producing varicose sutures, and the obscure sinus or truncation at its base define it neatly.

This genus is only known in the great Oolite, the newer parts of the tertiary formation and recent.

RISSOA lævis.

TAB. DCIX.—*fig.* 1.

SPEC. CHAR. Oblong-oval, smooth.

THE sides of the whorls are rather flat, and the aperture less expanded than in some species: the two last whorls are almost cylindrical.

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* Bull. de la Soc. Phil. de Paris, 1814.

RISSOA acuta.

TAB. DCIX.—*fig.* 2.

SPEC. CHAR. Turreted, acute, costated; costæ many, longitudinal; aperture large, outer lip much expanded; whorls convex, 7.

A RATHER large aperture, a pointed, almost subulate spire, and ten or twelve rows of costæ mark this species.

RISSOA obliquata.

TAB. DCIX.—*fig.* 3.

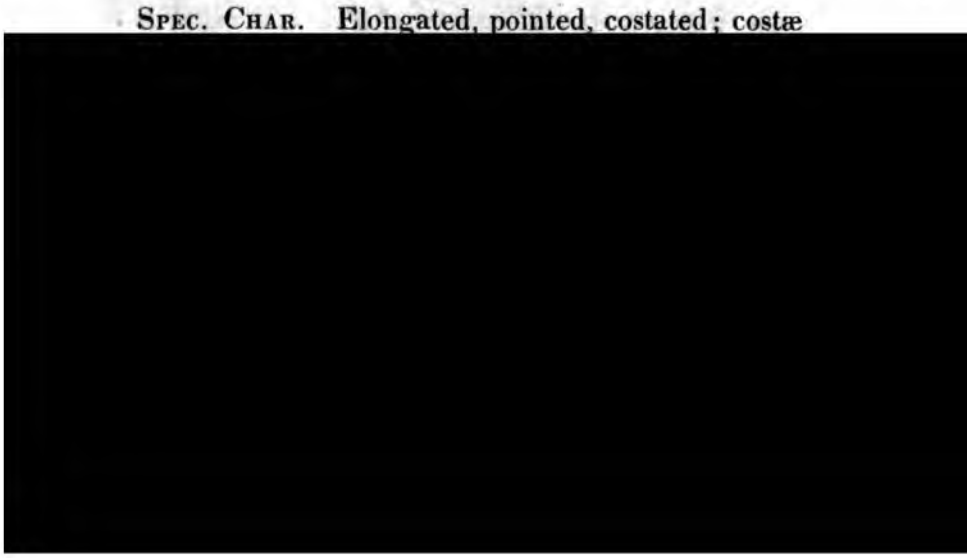
SPEC. CHAR. Elongated, pointed, costated; costæ many, oblique, curved; aperture rather small; whorls 5 or 6, convex.

SHORTER in proportion to its width than the last, with fewer and oblique ribs and a smaller aperture; otherwise much resembling it.

RISSOA duplicata.

TAB. DCIX.—*fig.* 4.

SPEC. CHAR. Elongated, pointed, costated; costæ



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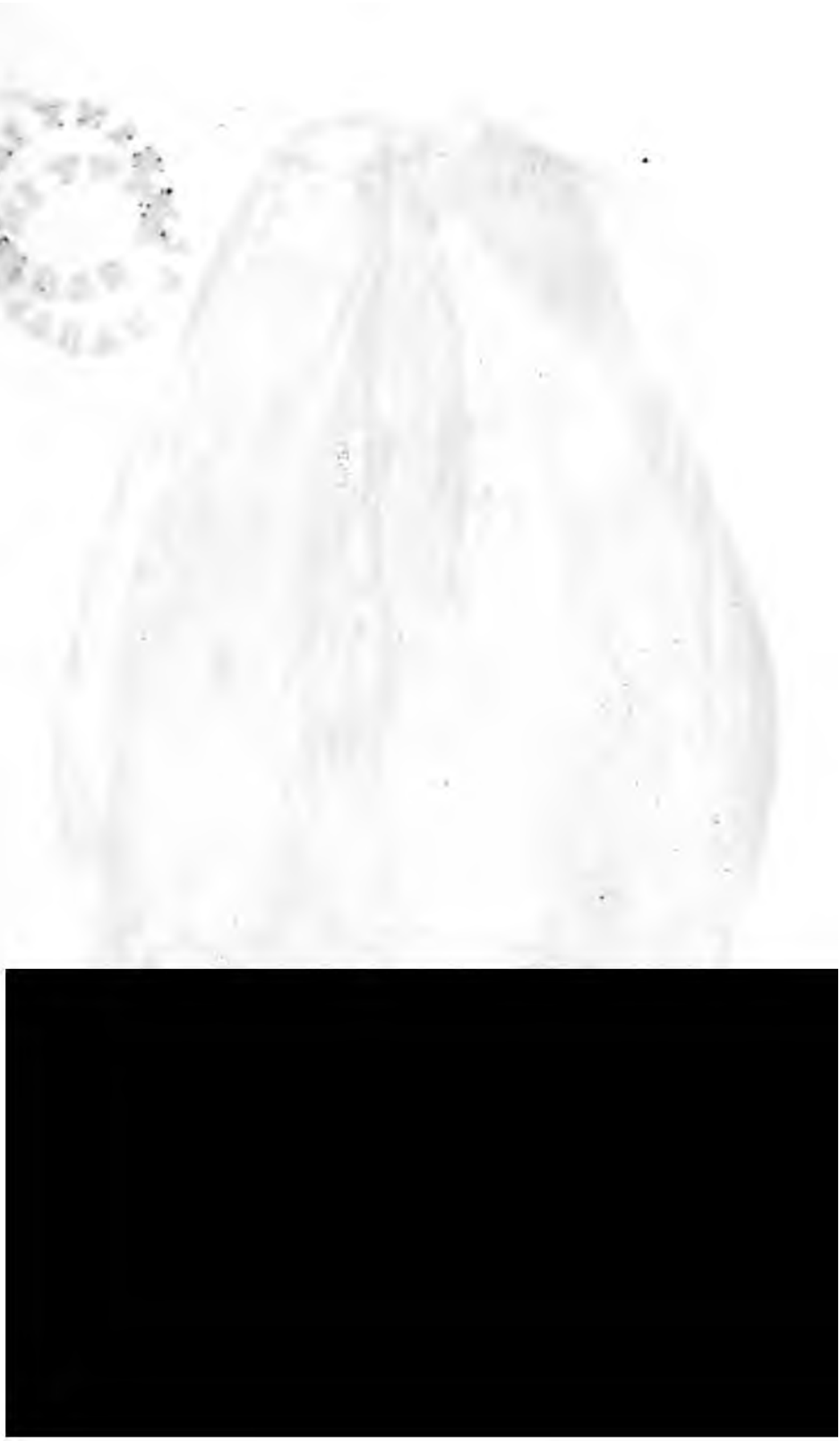

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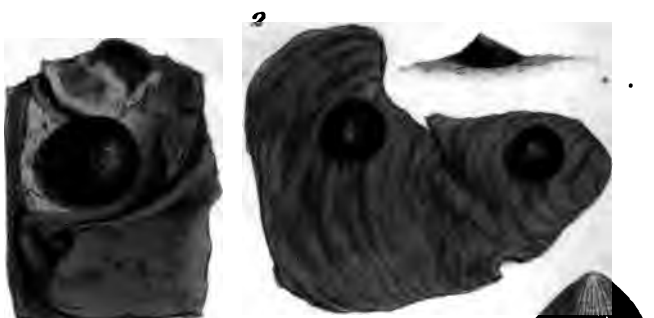

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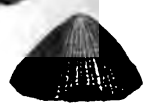

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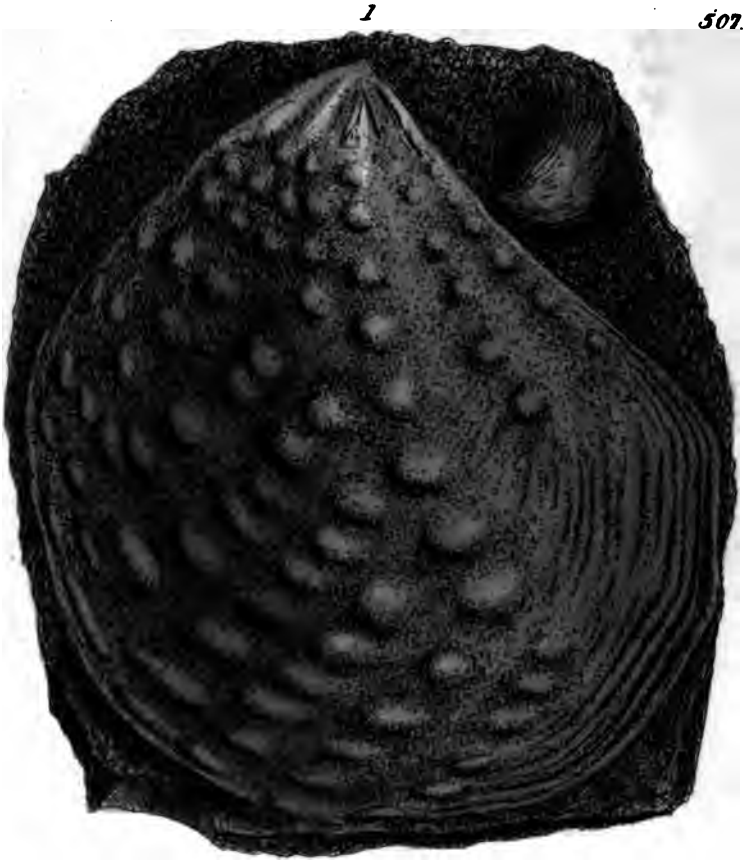

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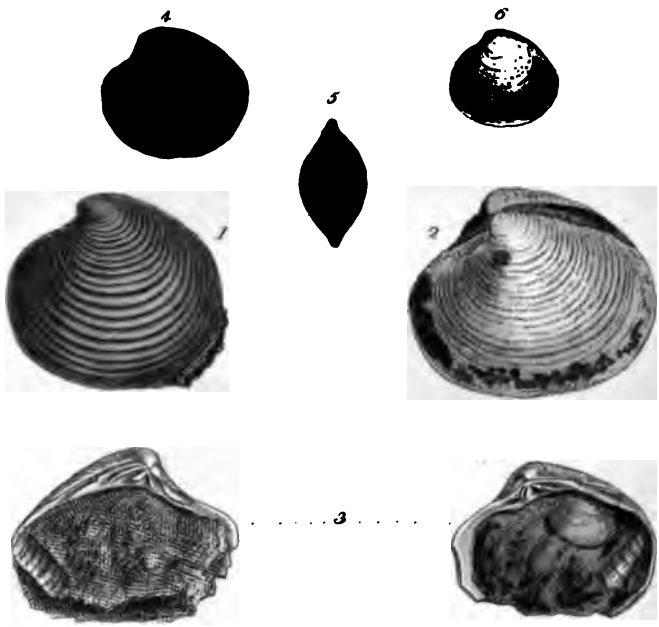

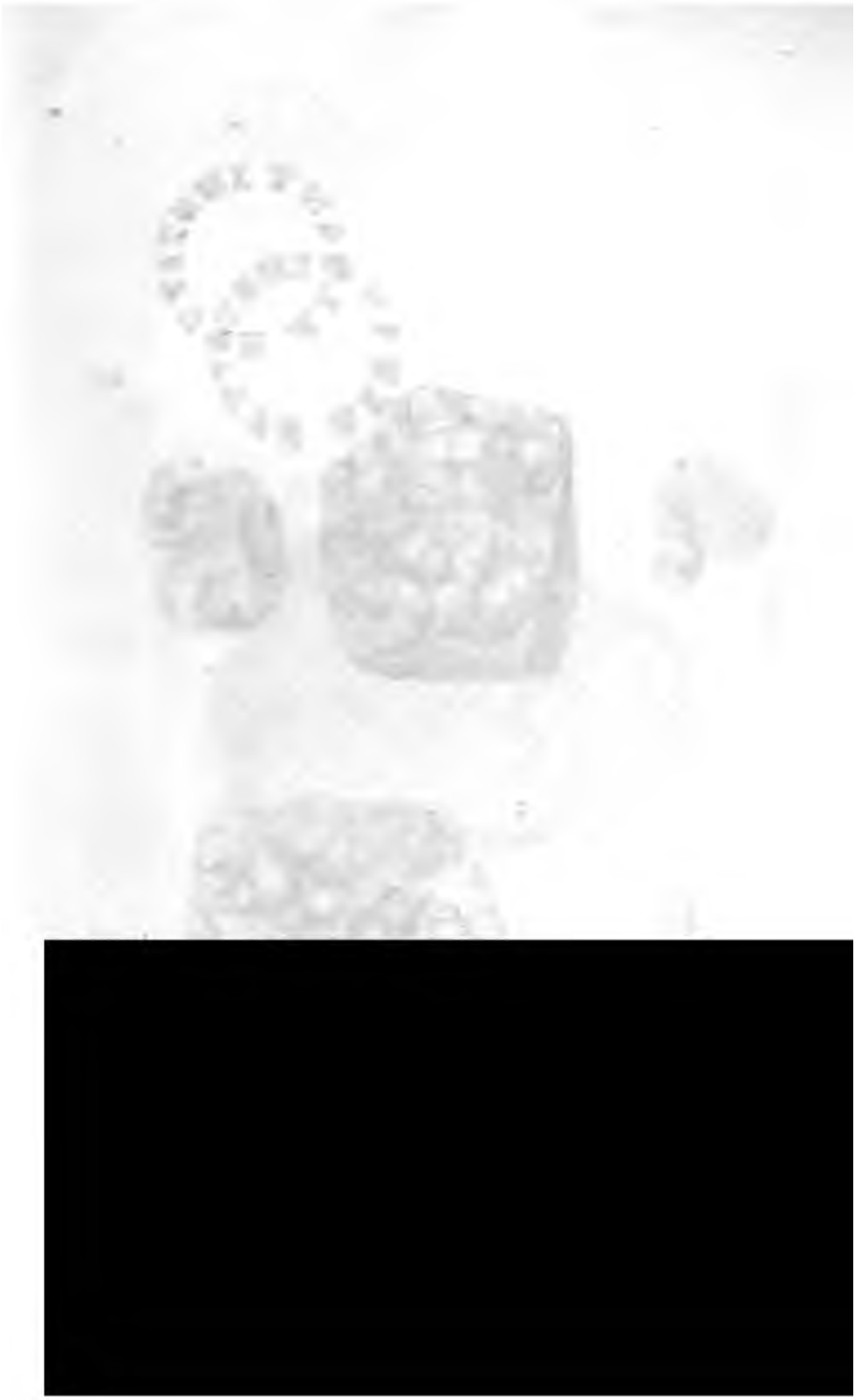

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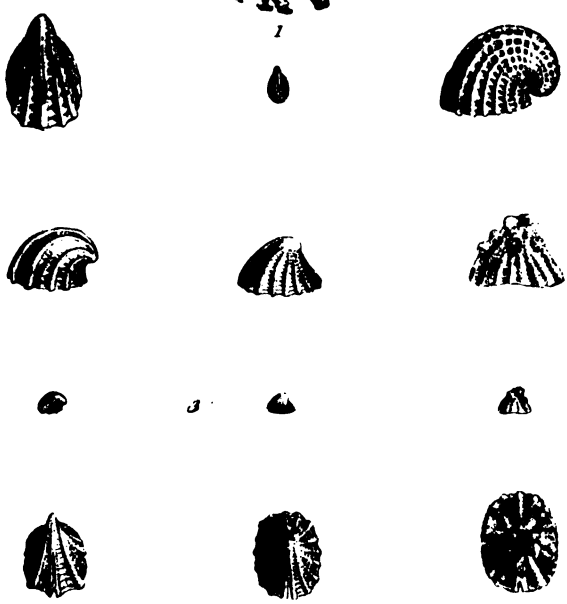

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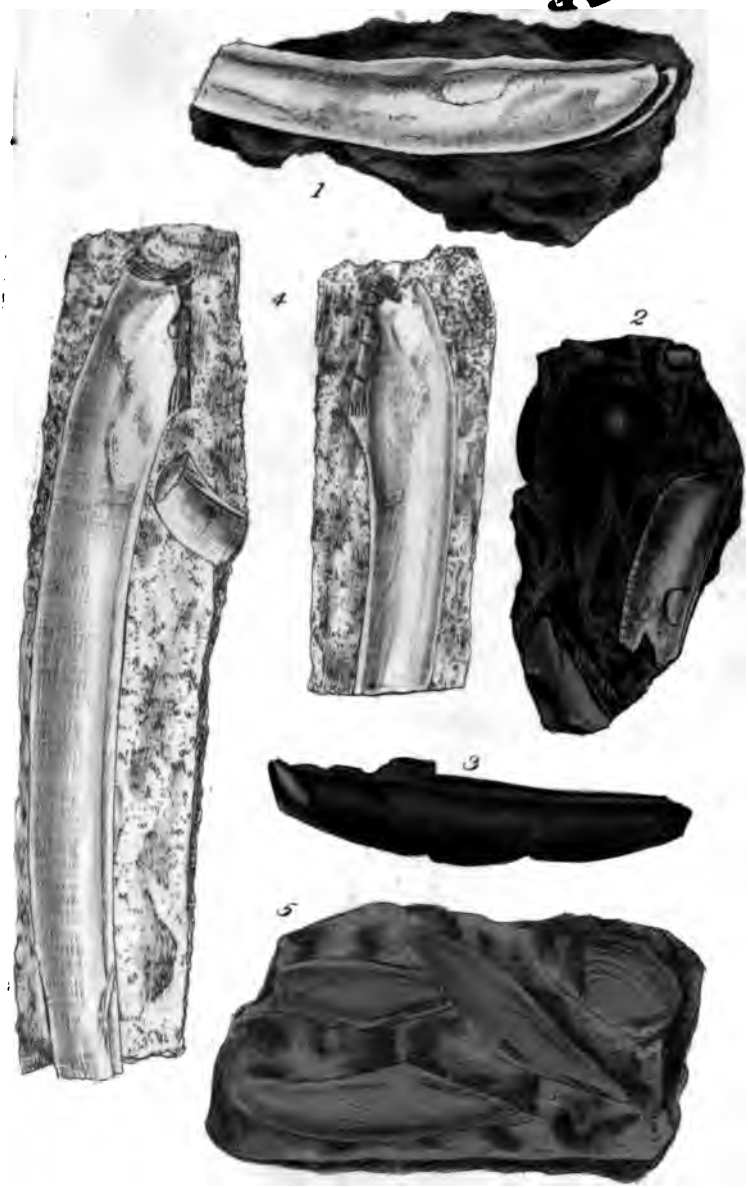

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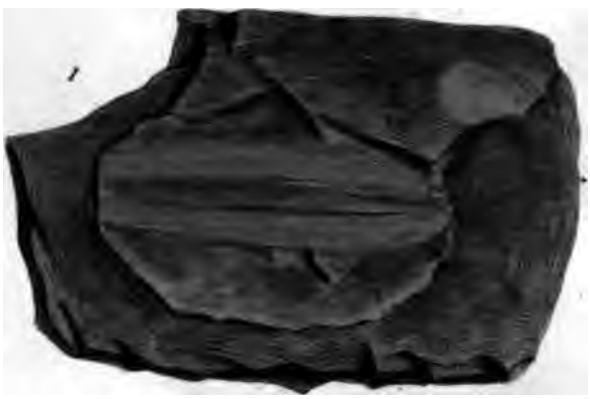
SMITHSONIAN INSTITUTE



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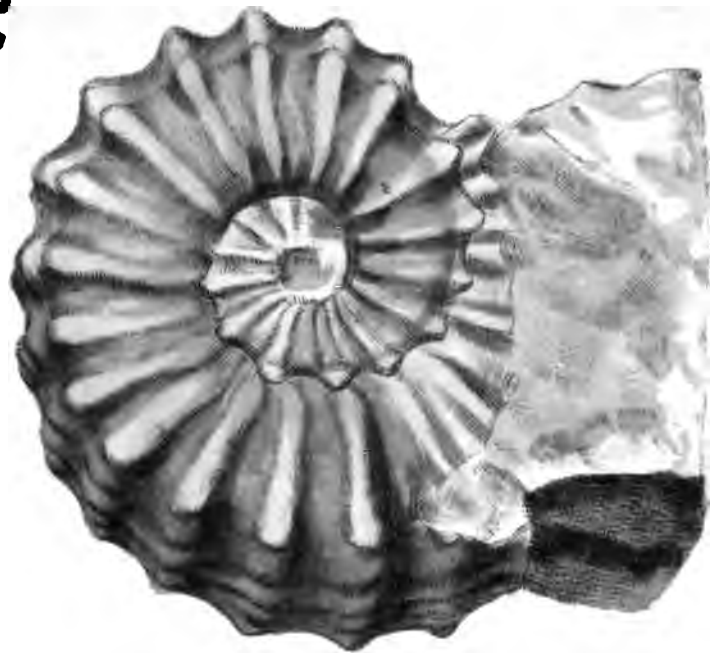

By Prof. JOSEPH HENRY, Sec...
...ion, Washington.

The Meteorograph: a self-registering instrument ...
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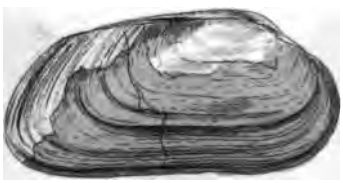
SMITHSONIAN INSTITUTE ARCHIVES

INSTITUTE ALBERTA



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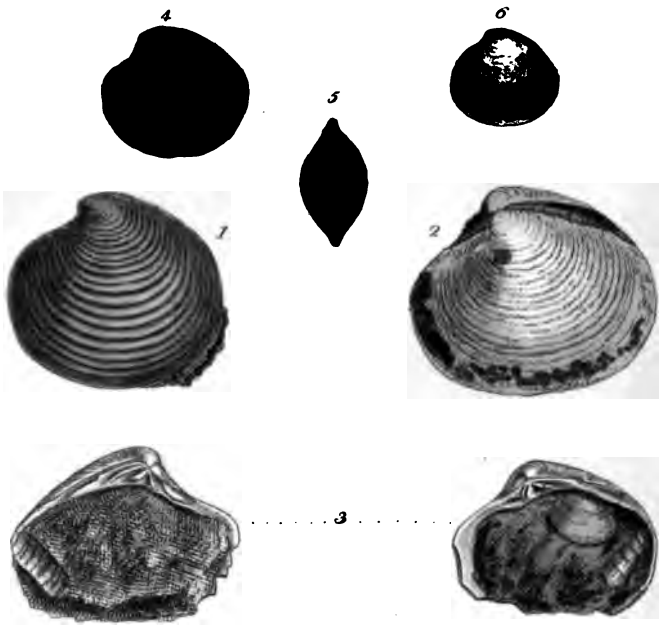

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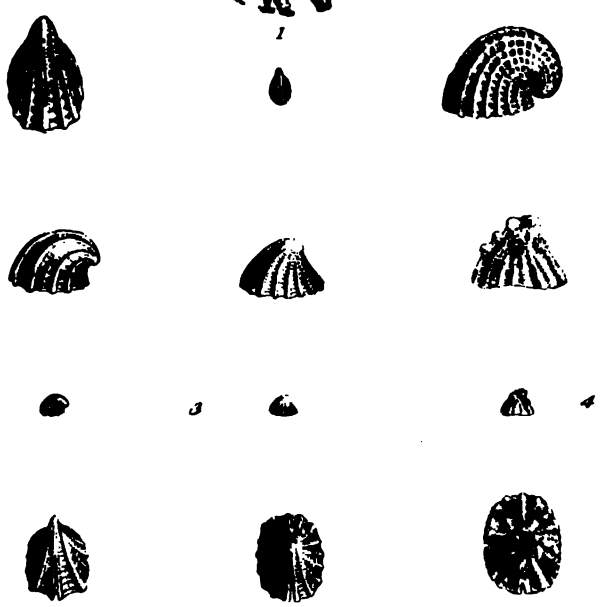

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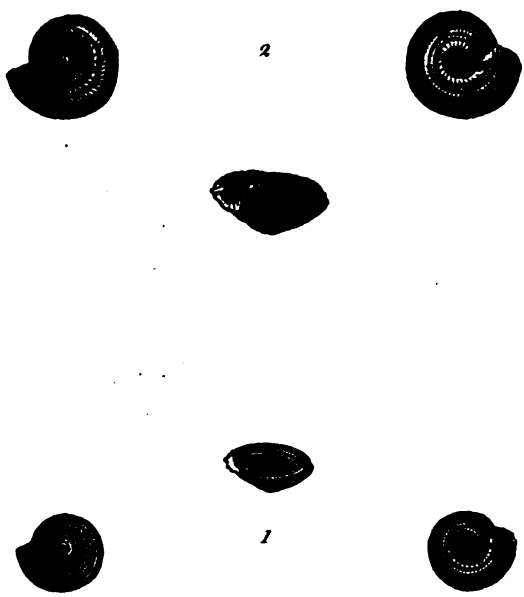

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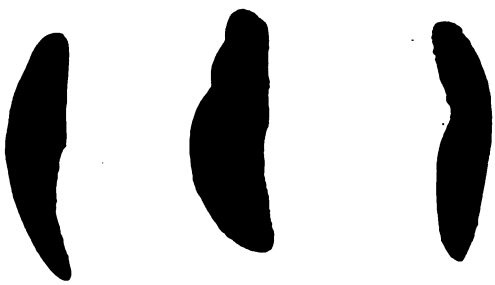

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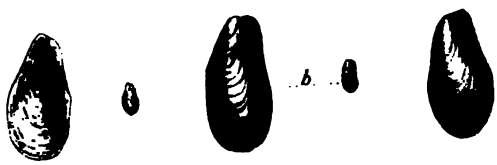

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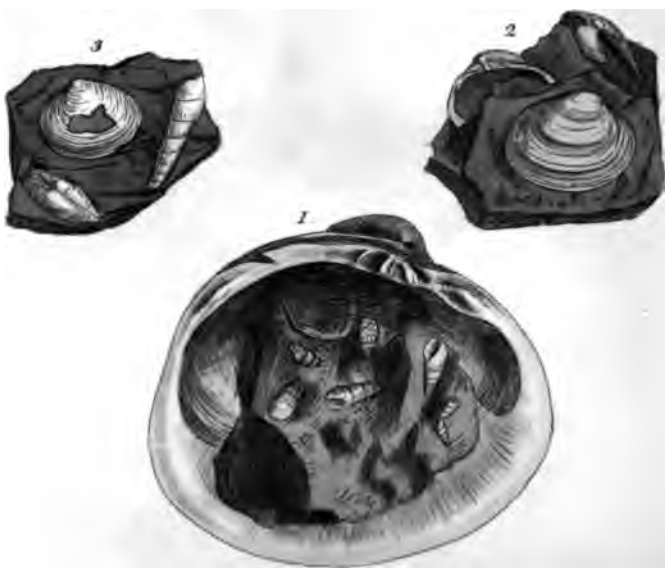

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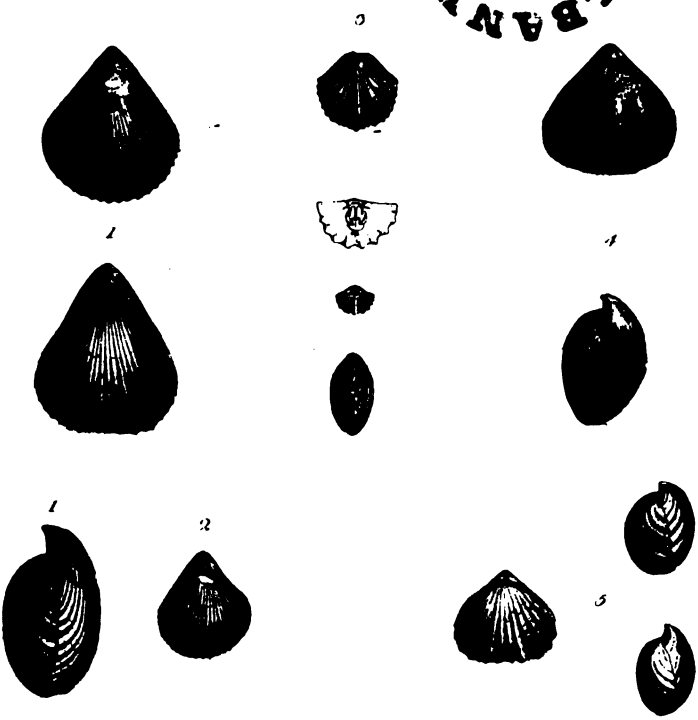

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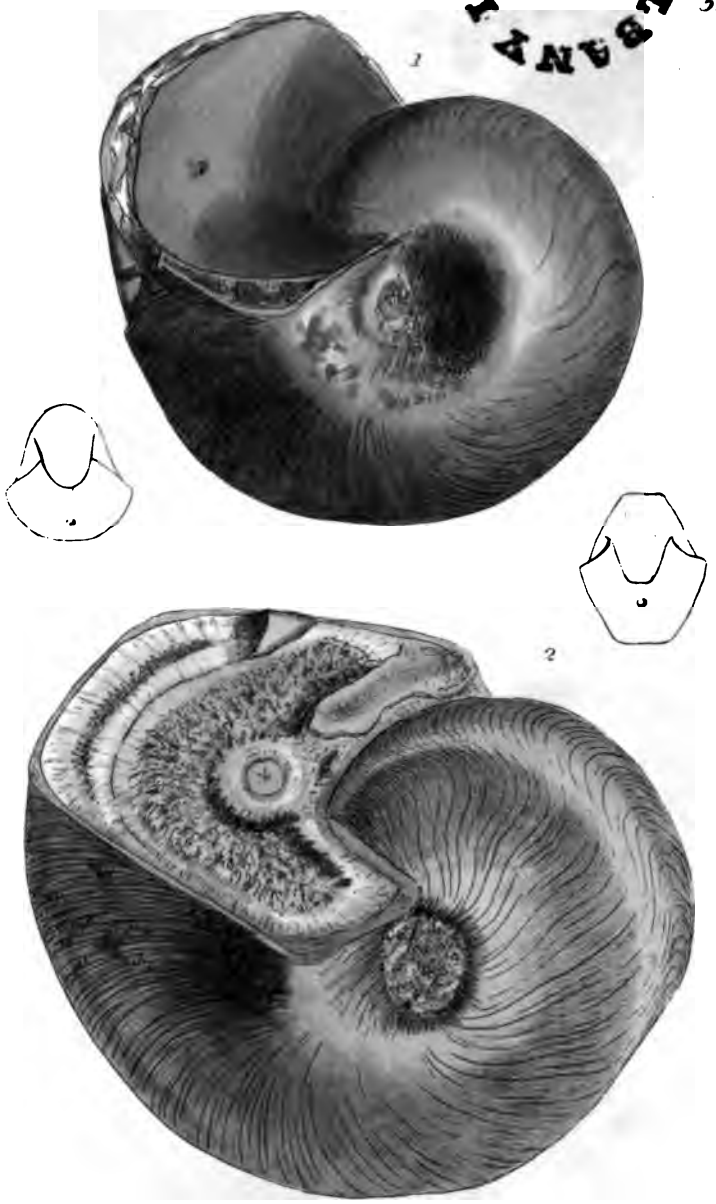

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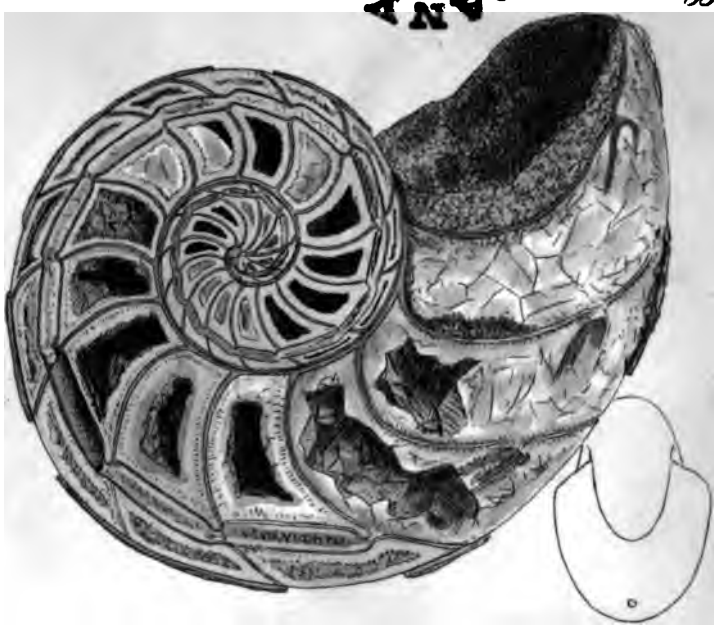

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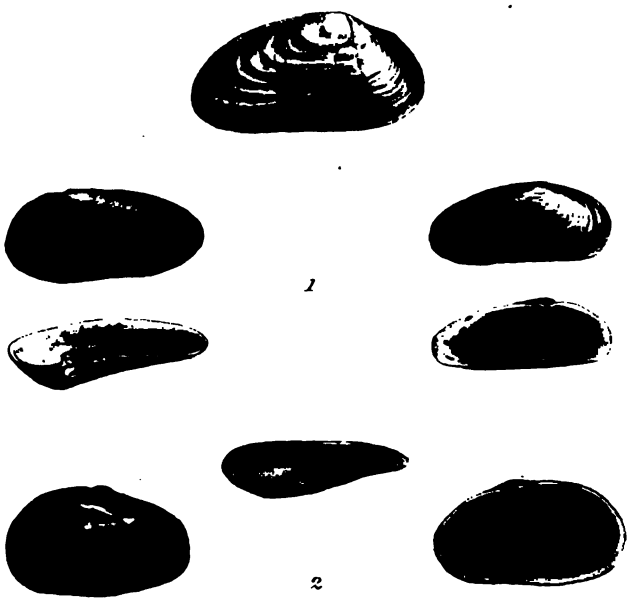

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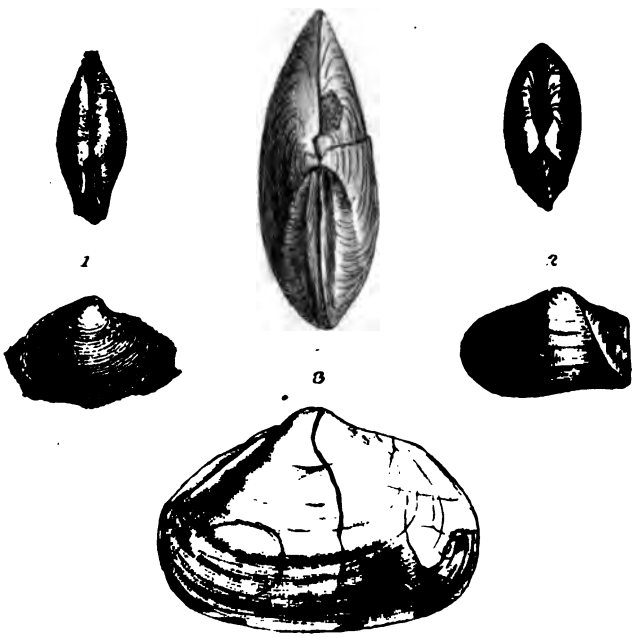

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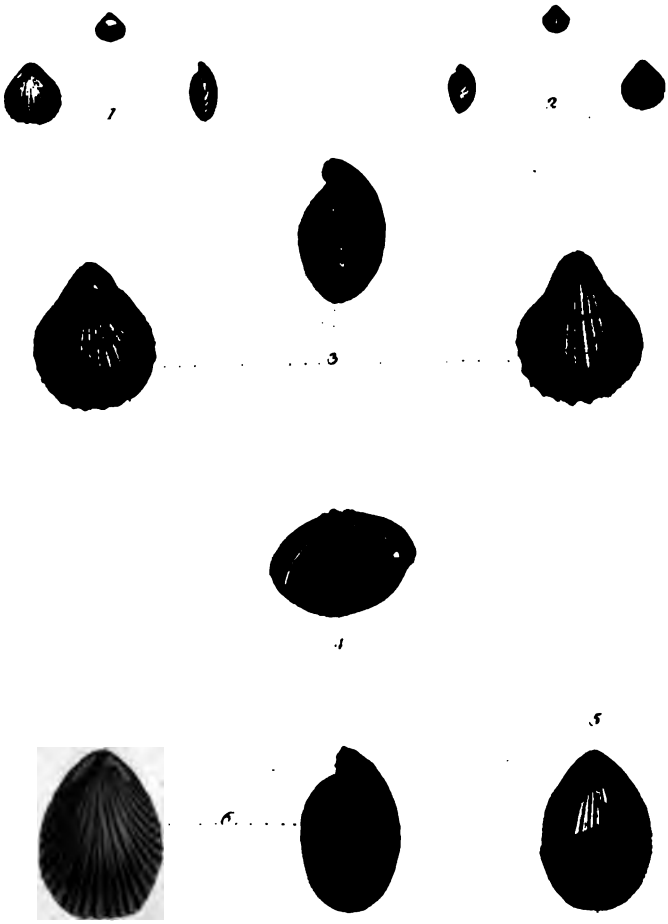

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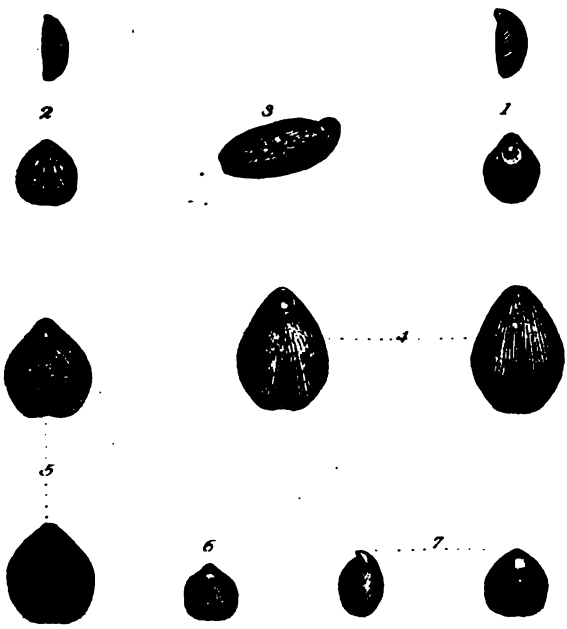

ALBANY INSTITUTE

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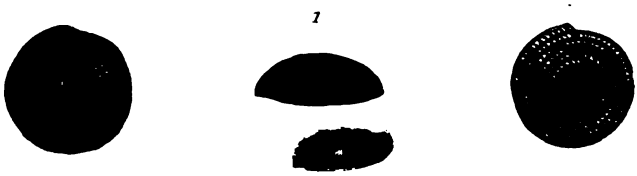

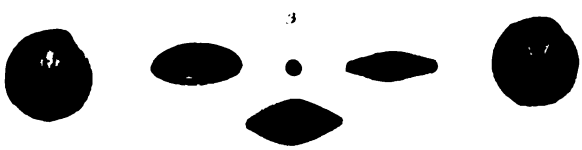

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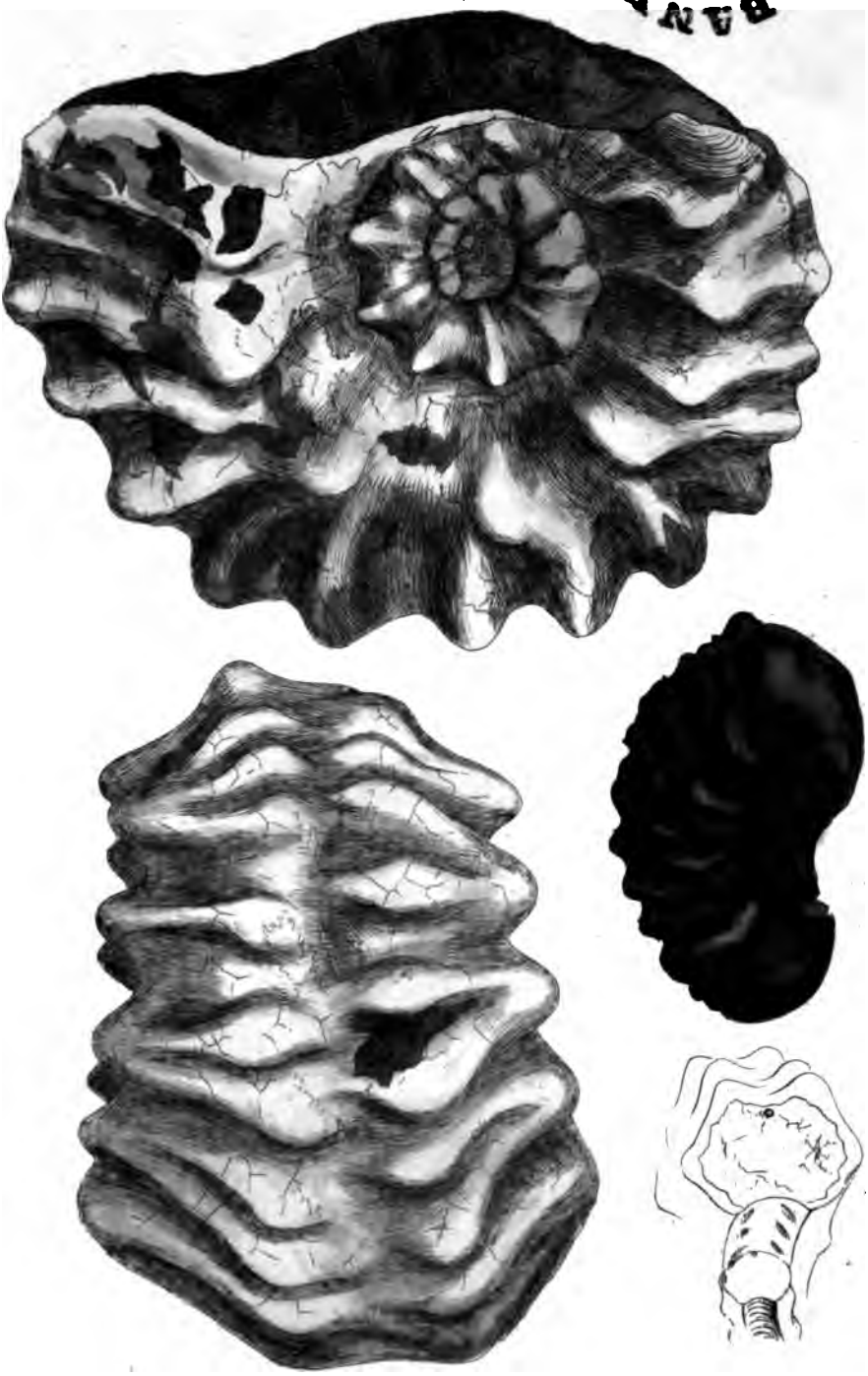

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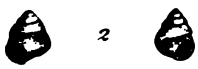

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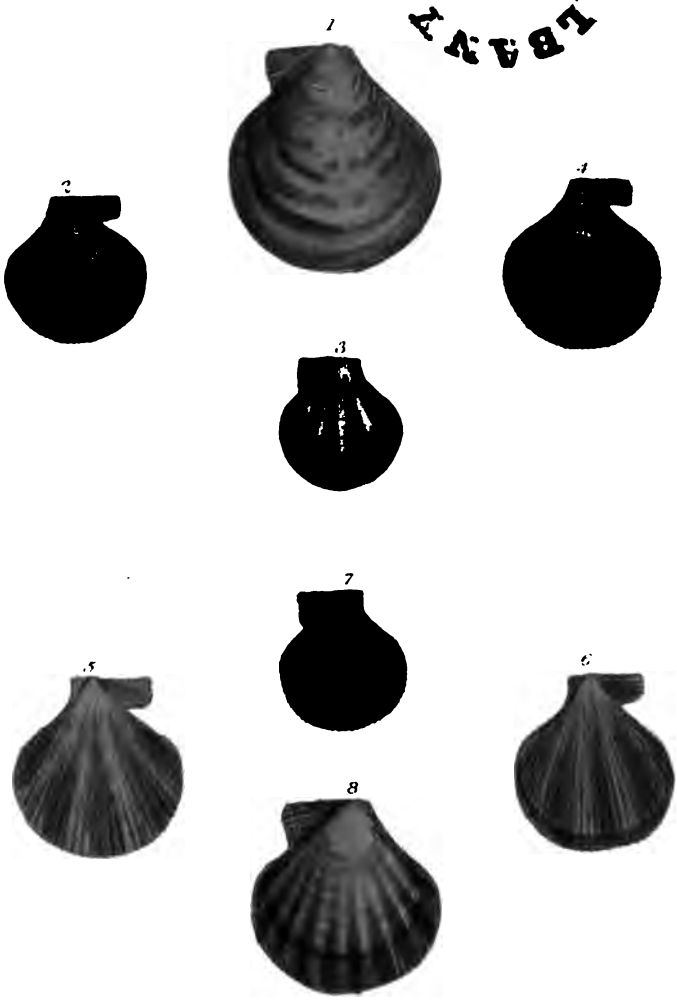

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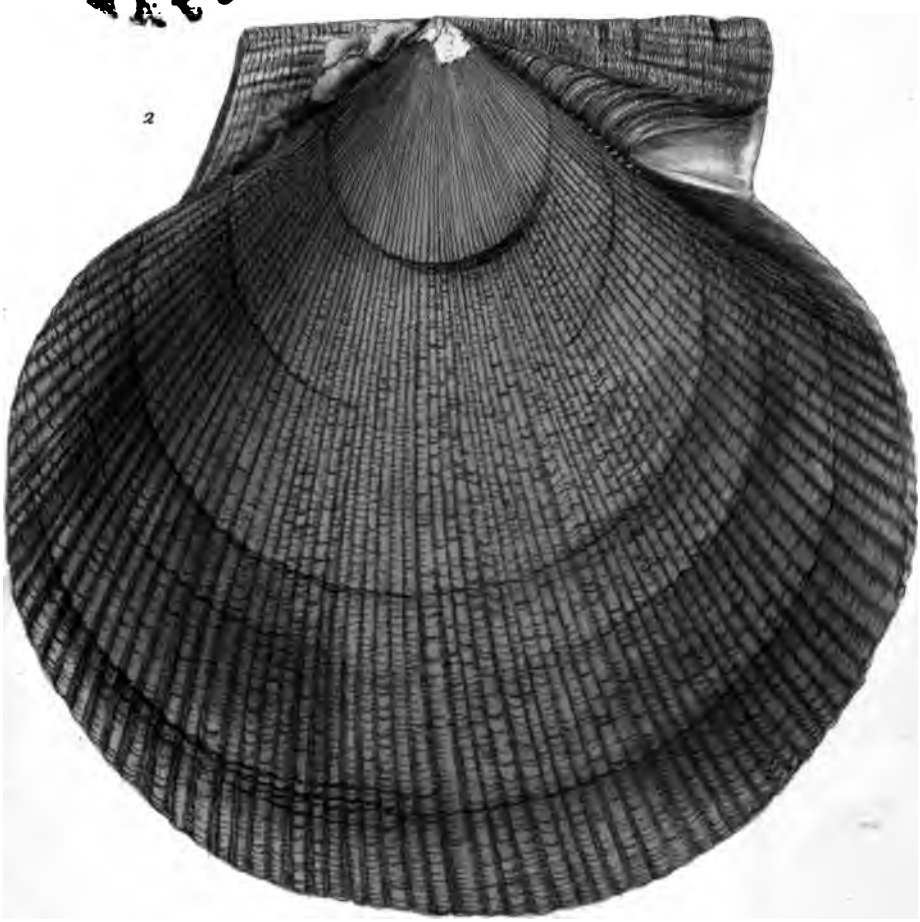

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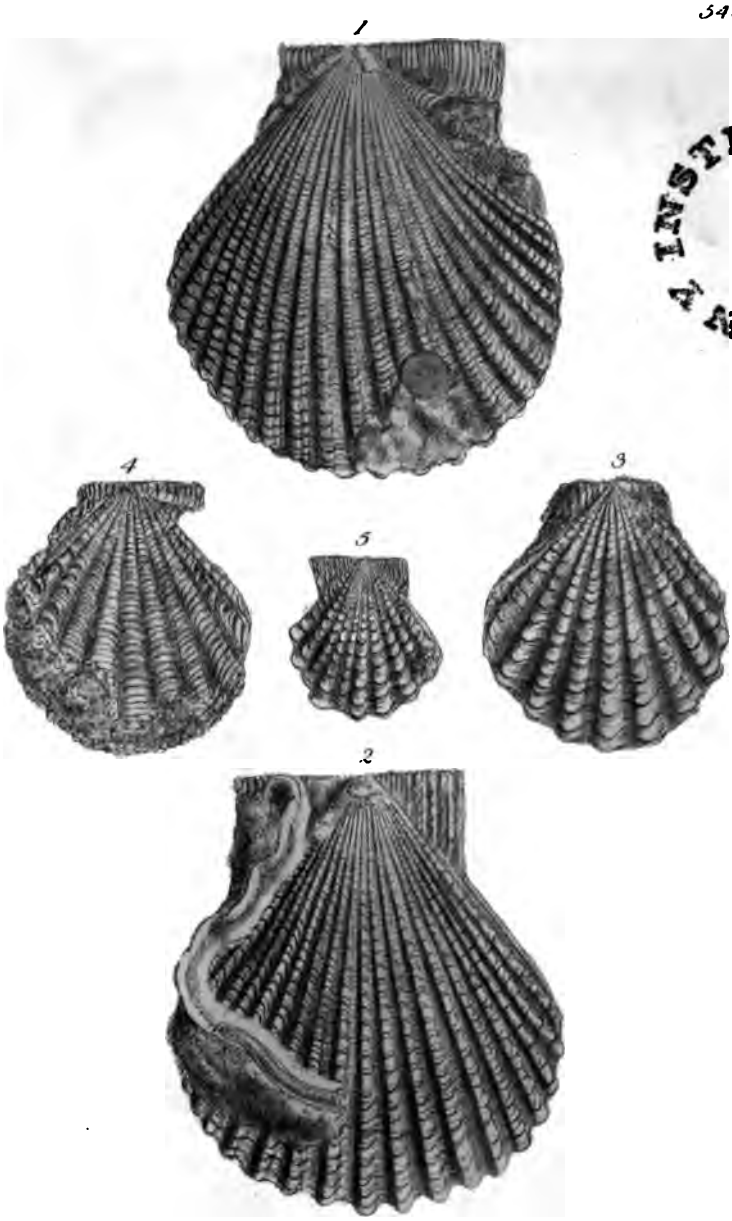

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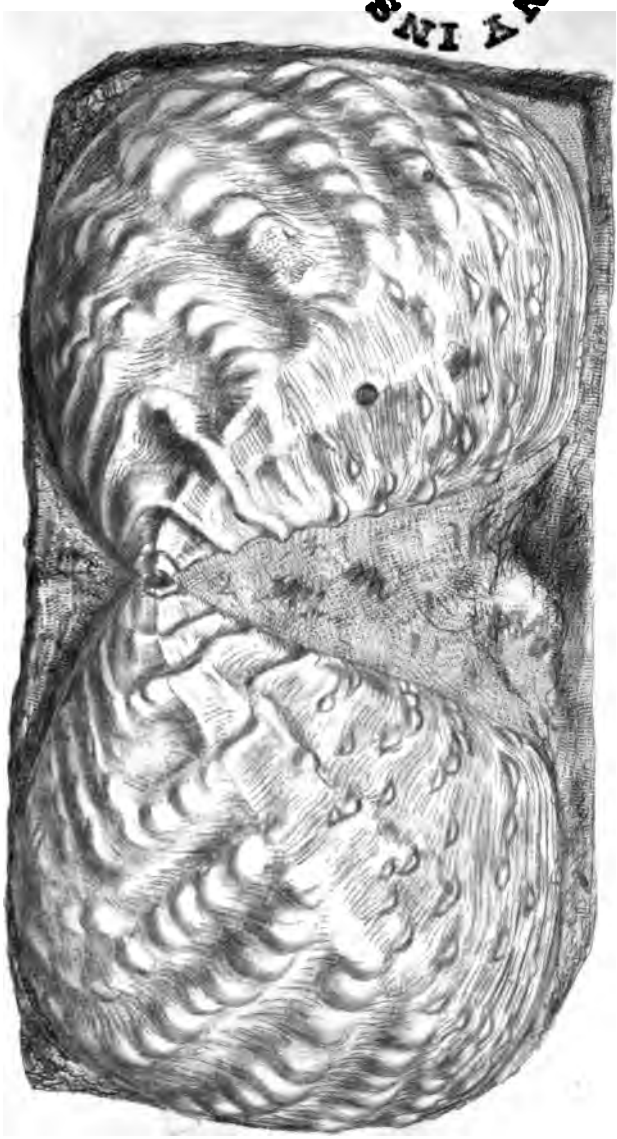

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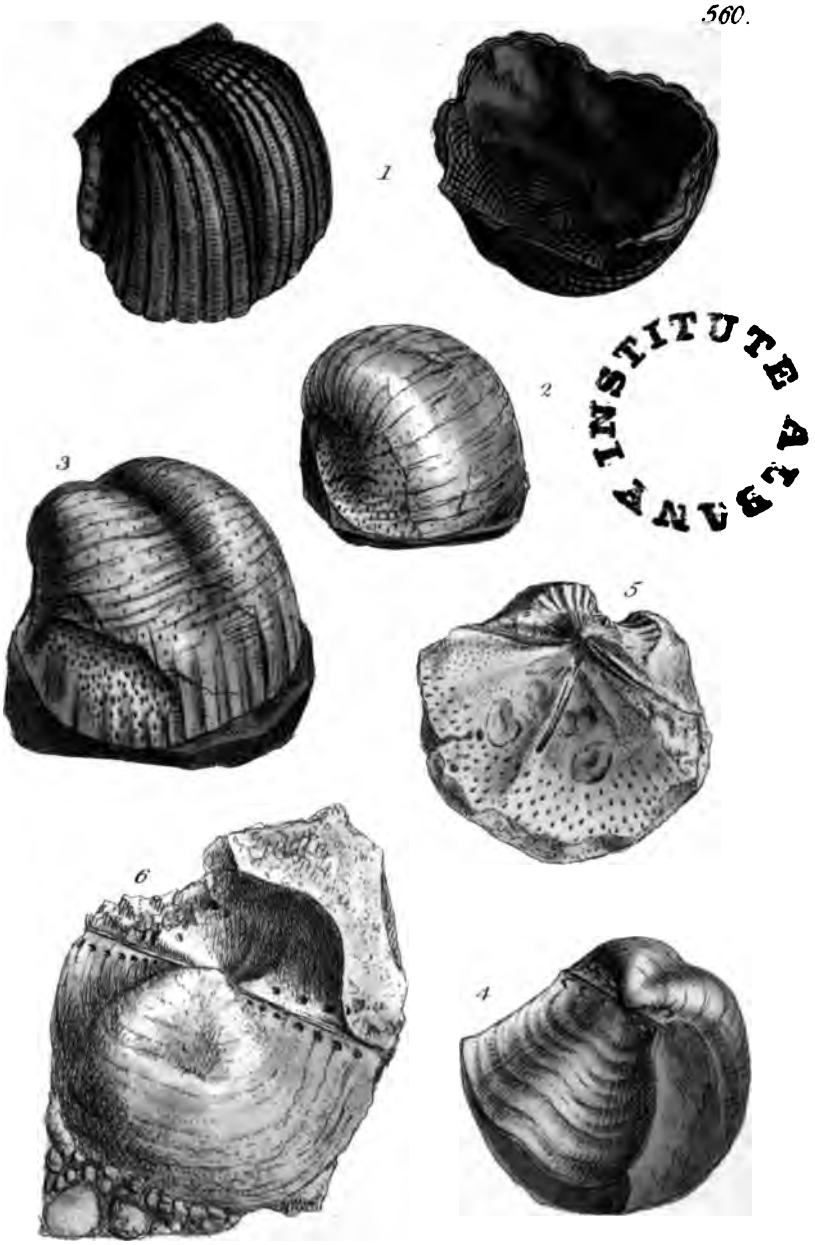

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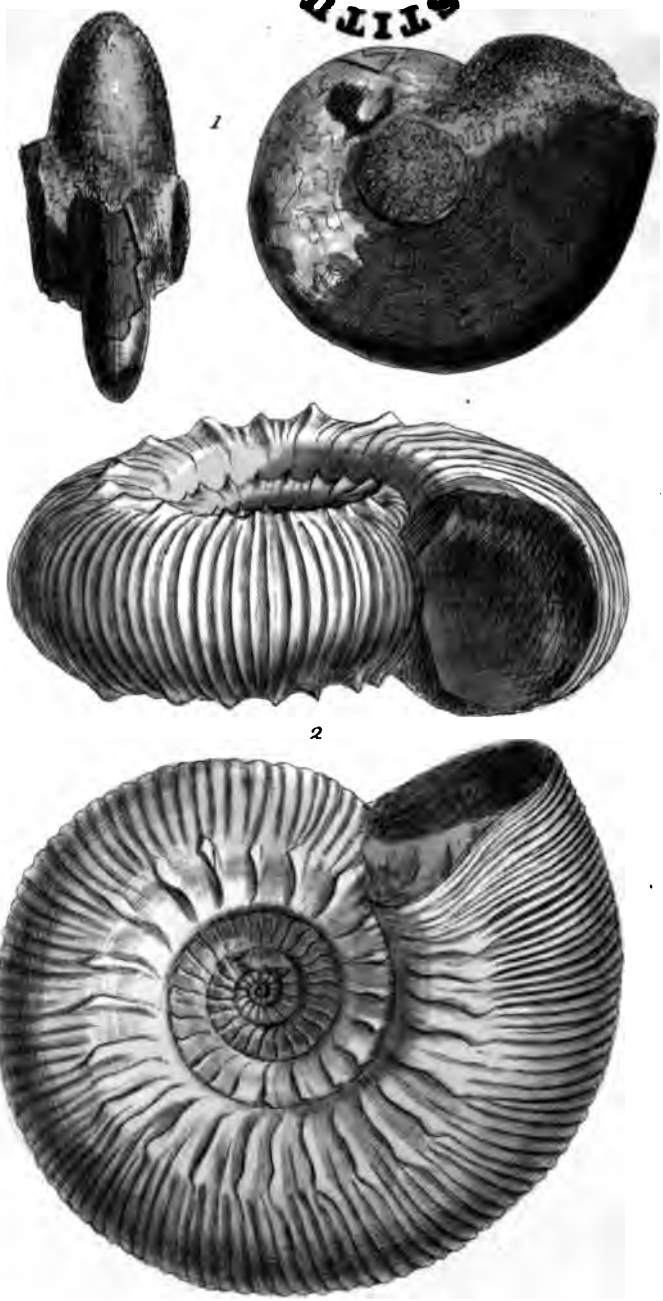

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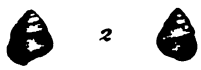

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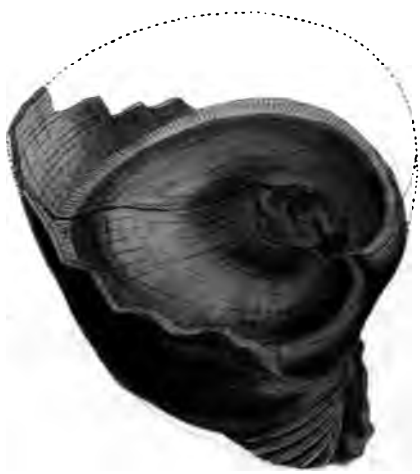

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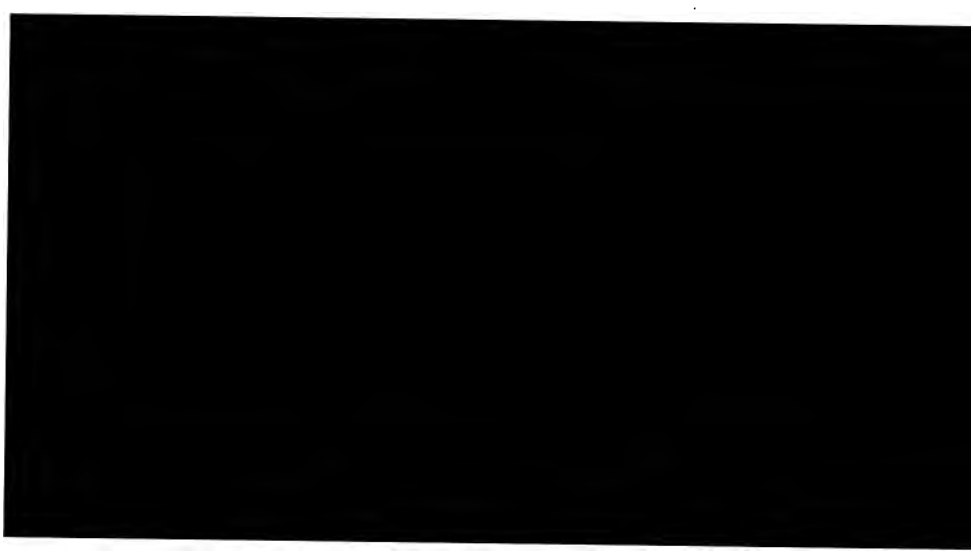

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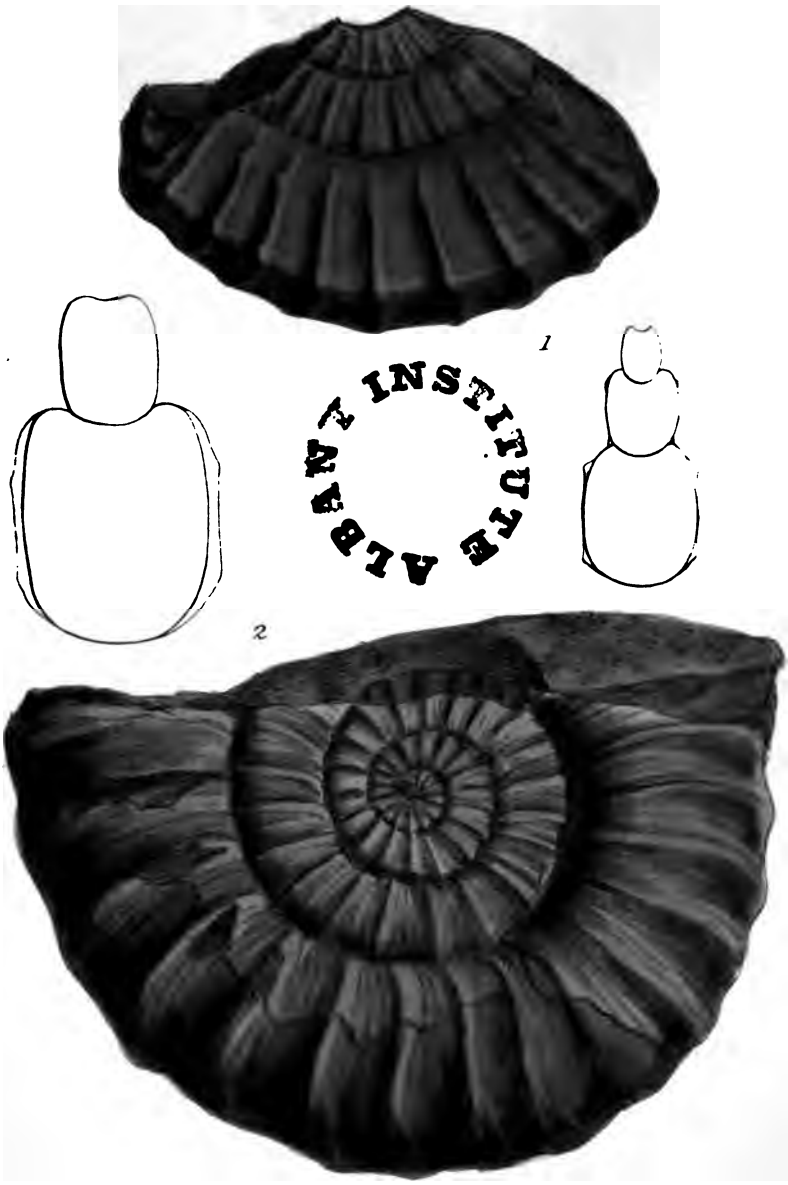
INSTITUTE LIBRARY



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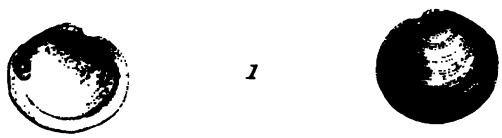

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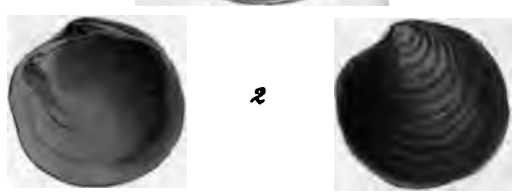

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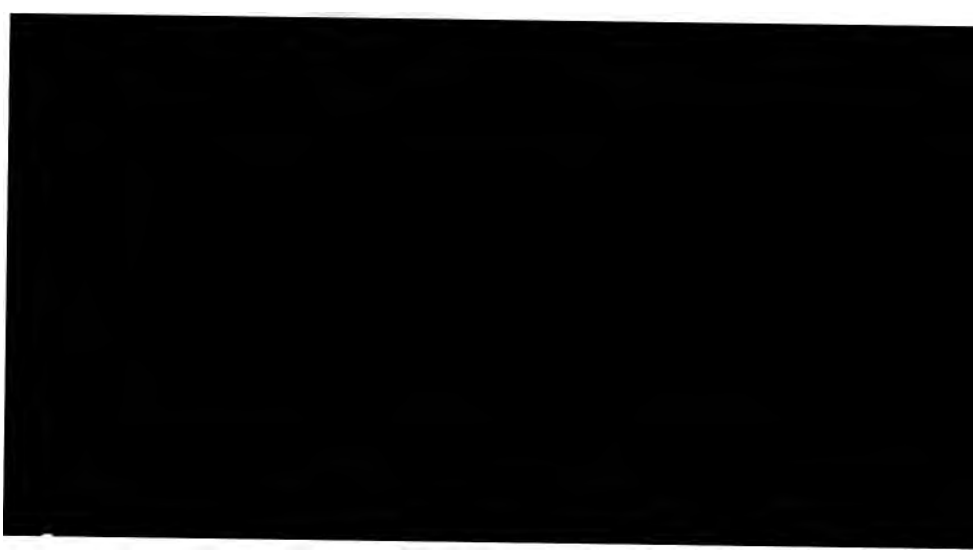

LIBRARY INSTITUTE

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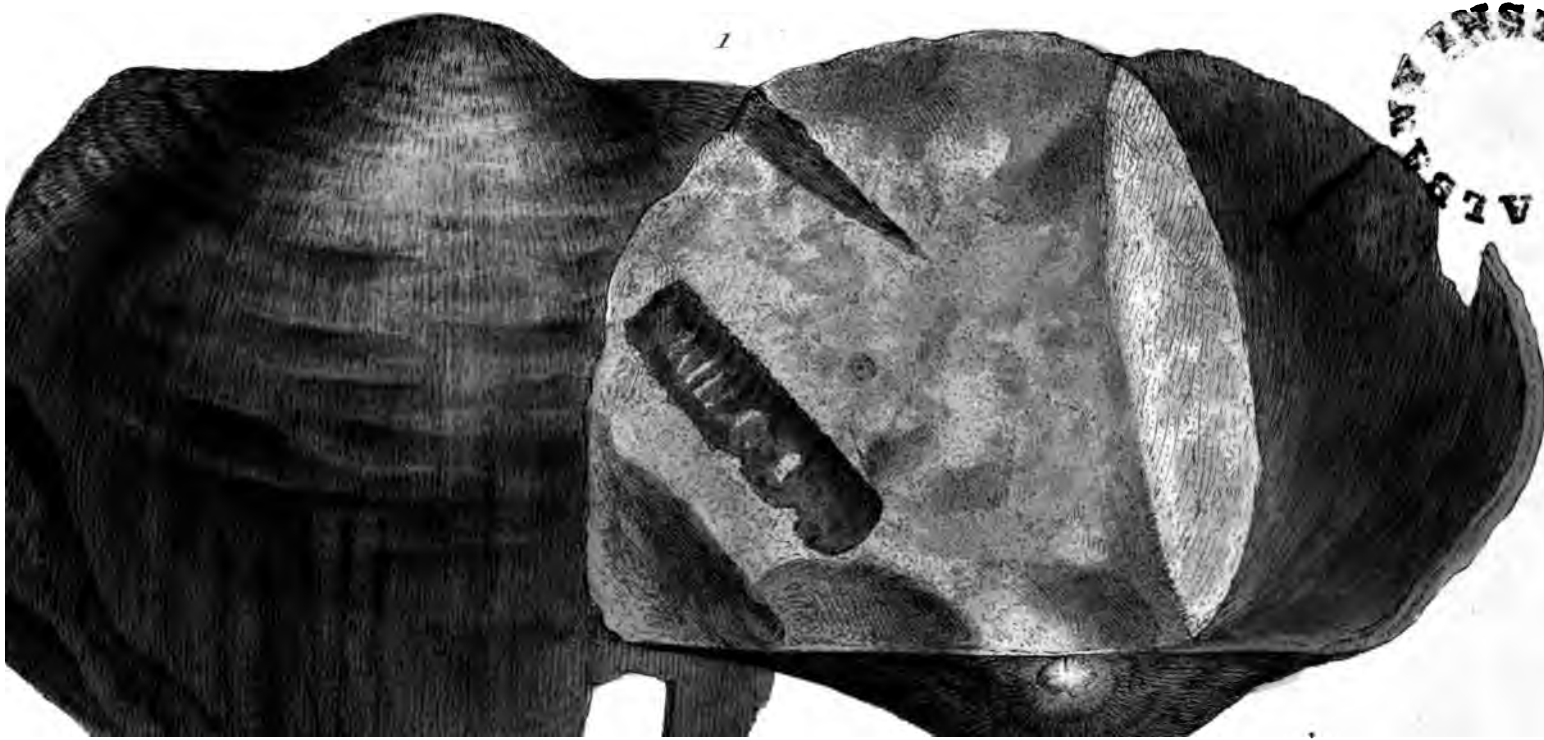

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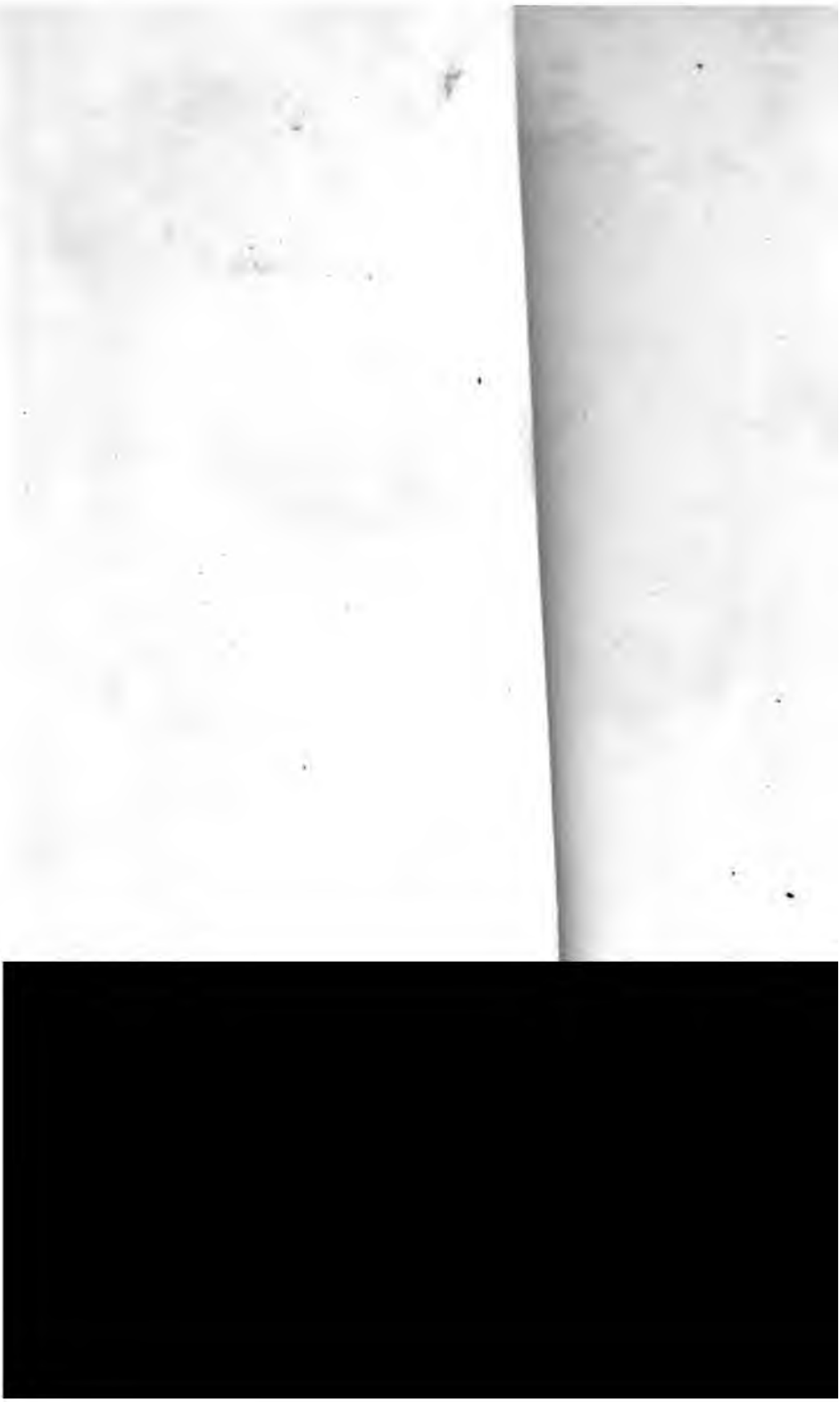

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INSTITUTE LIBRARY

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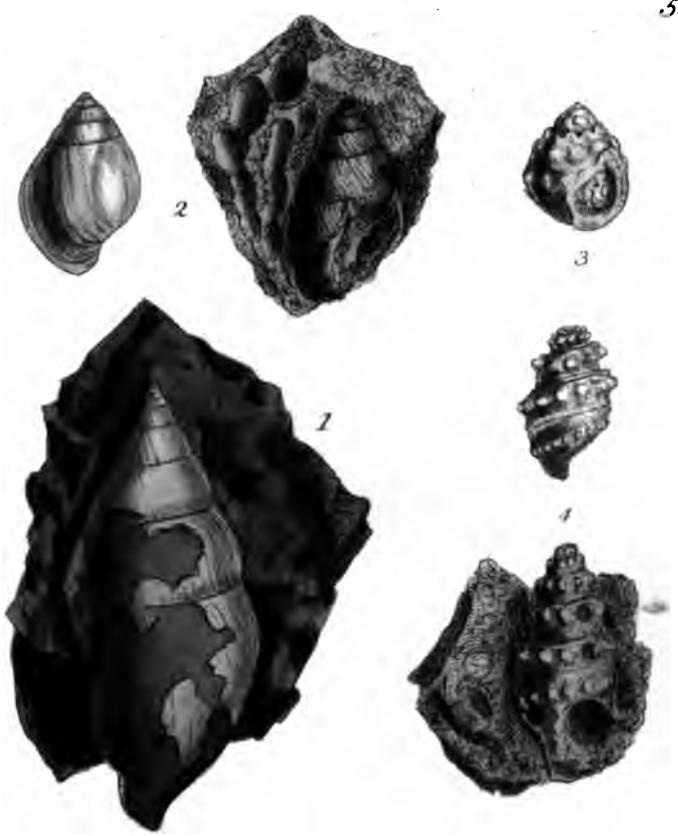

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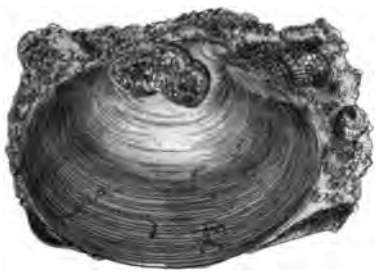

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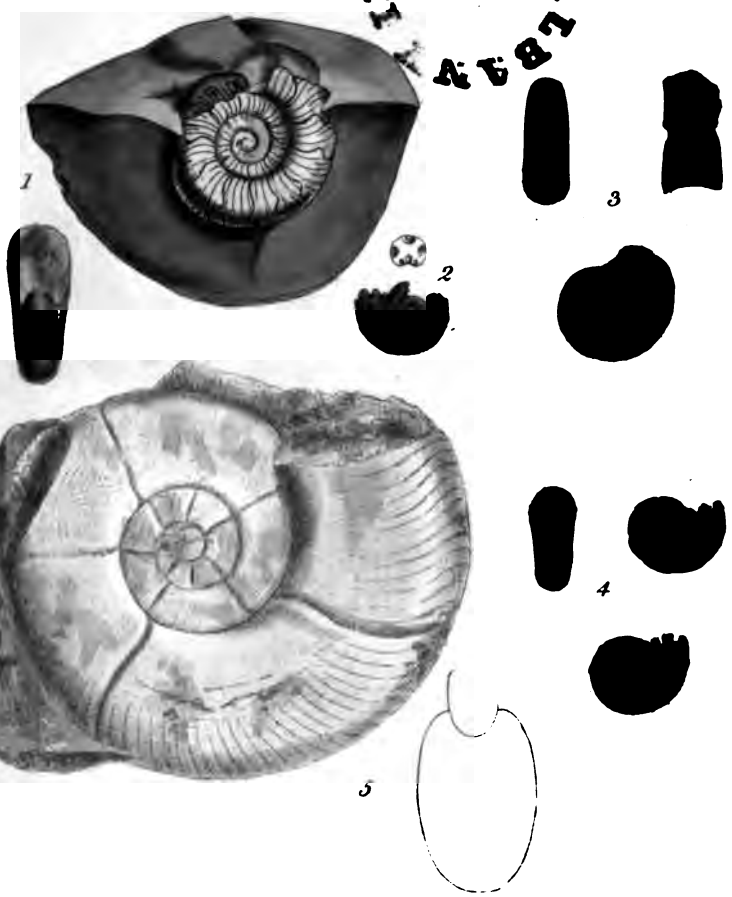

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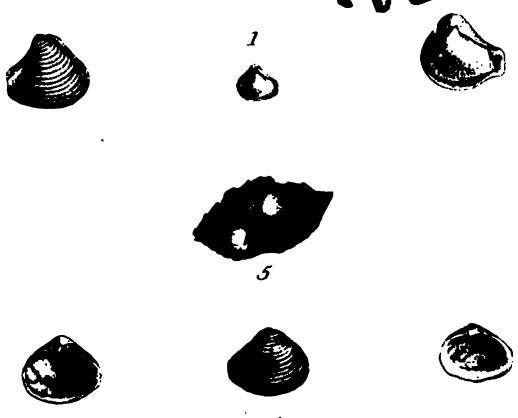

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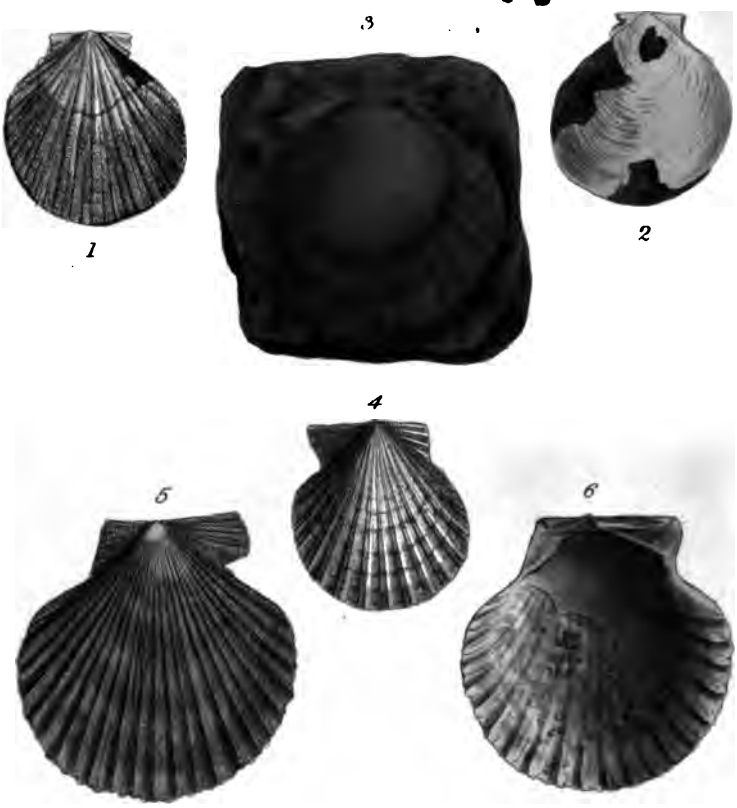

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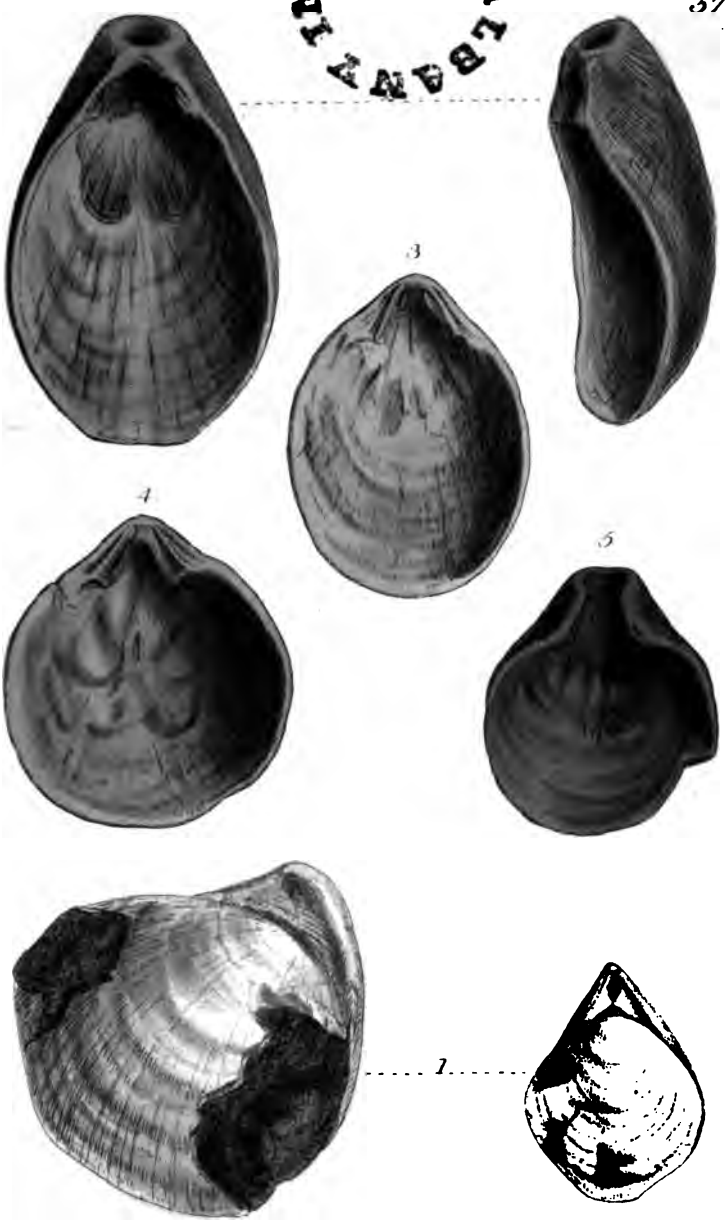

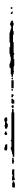

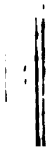

SMITHSONIAN INSTITUTE
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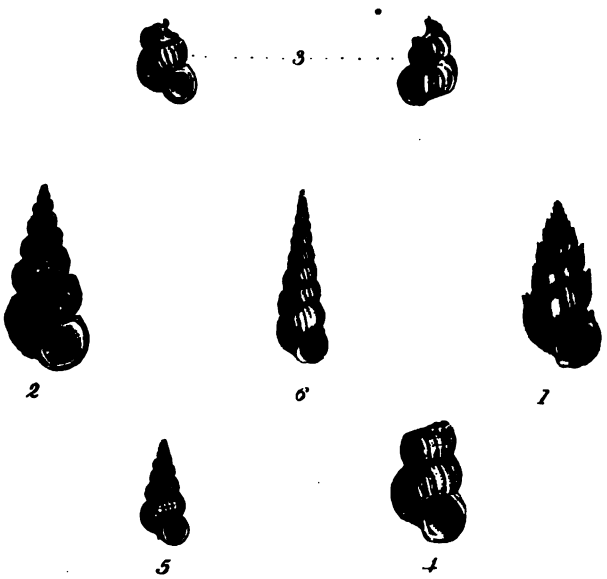

ALBANY INSTITUTE

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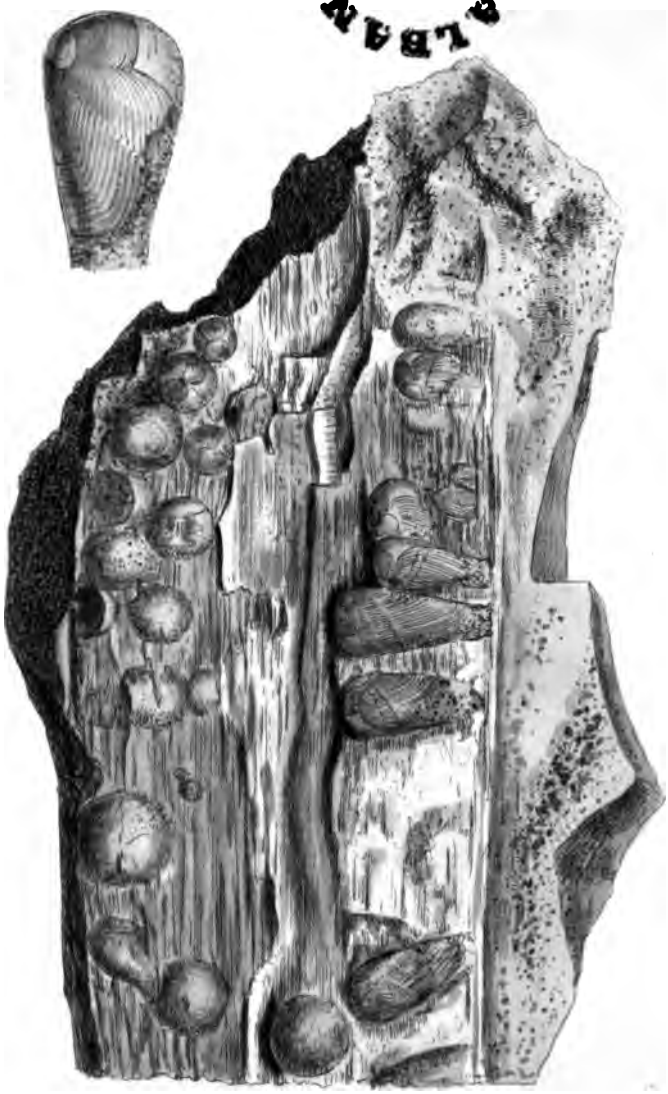
ALBANY INSTITUTE



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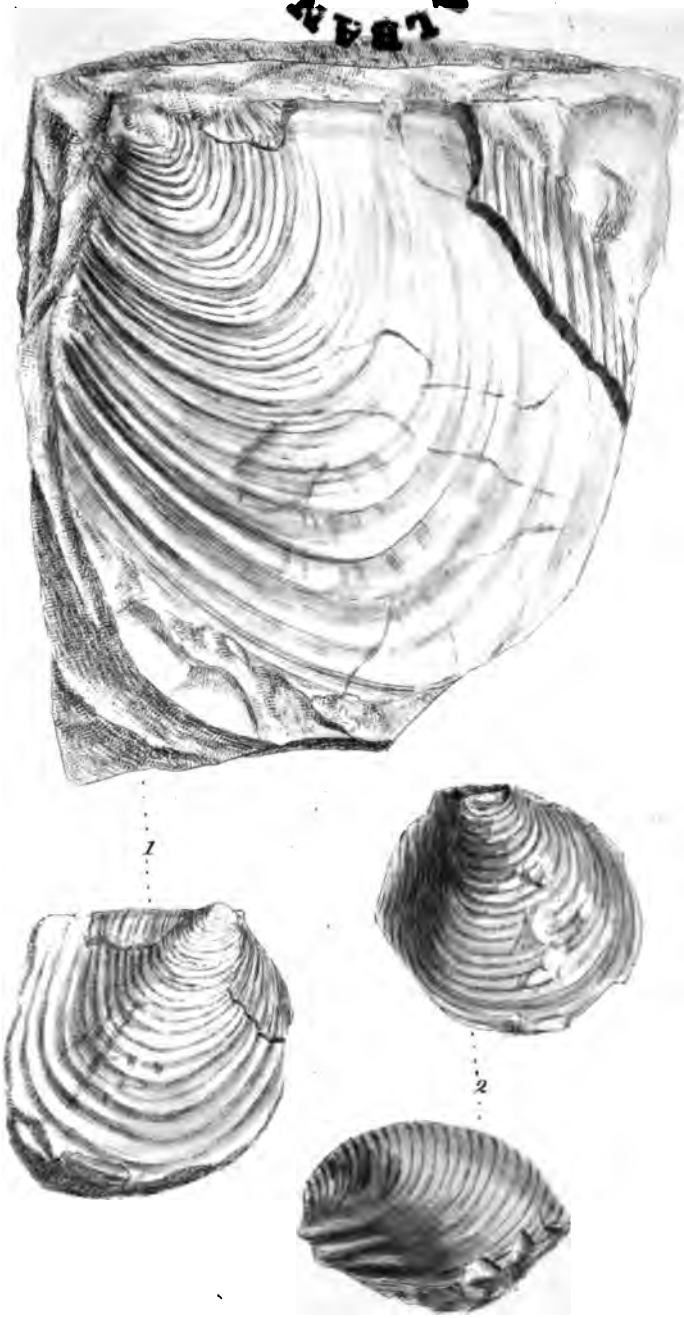

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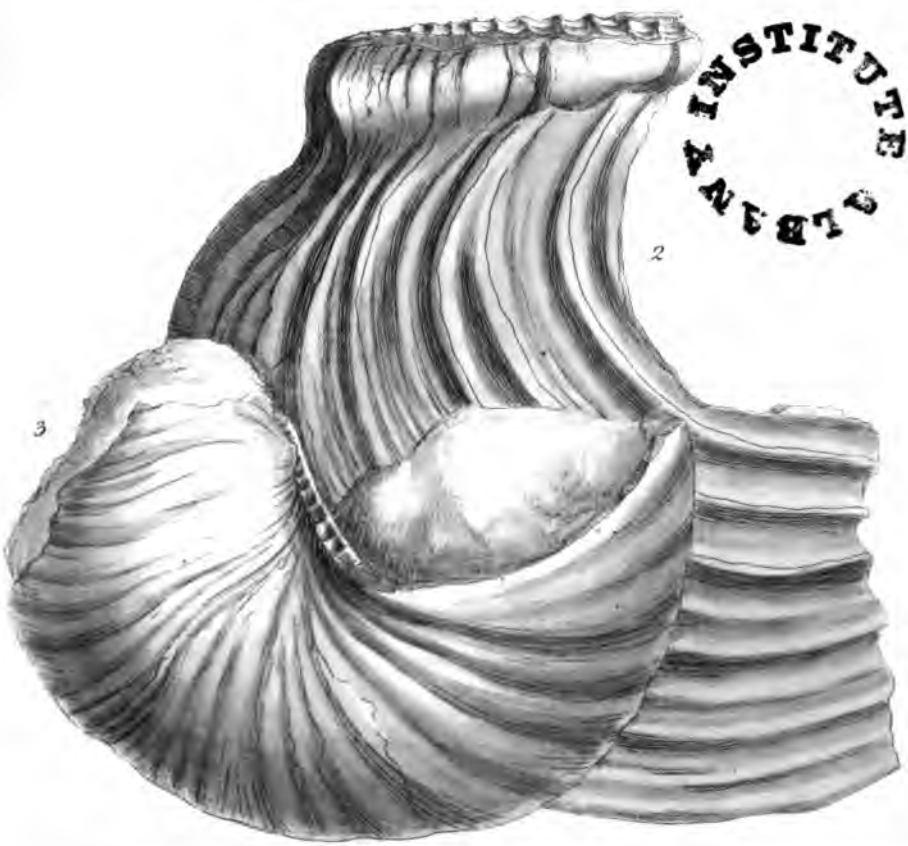

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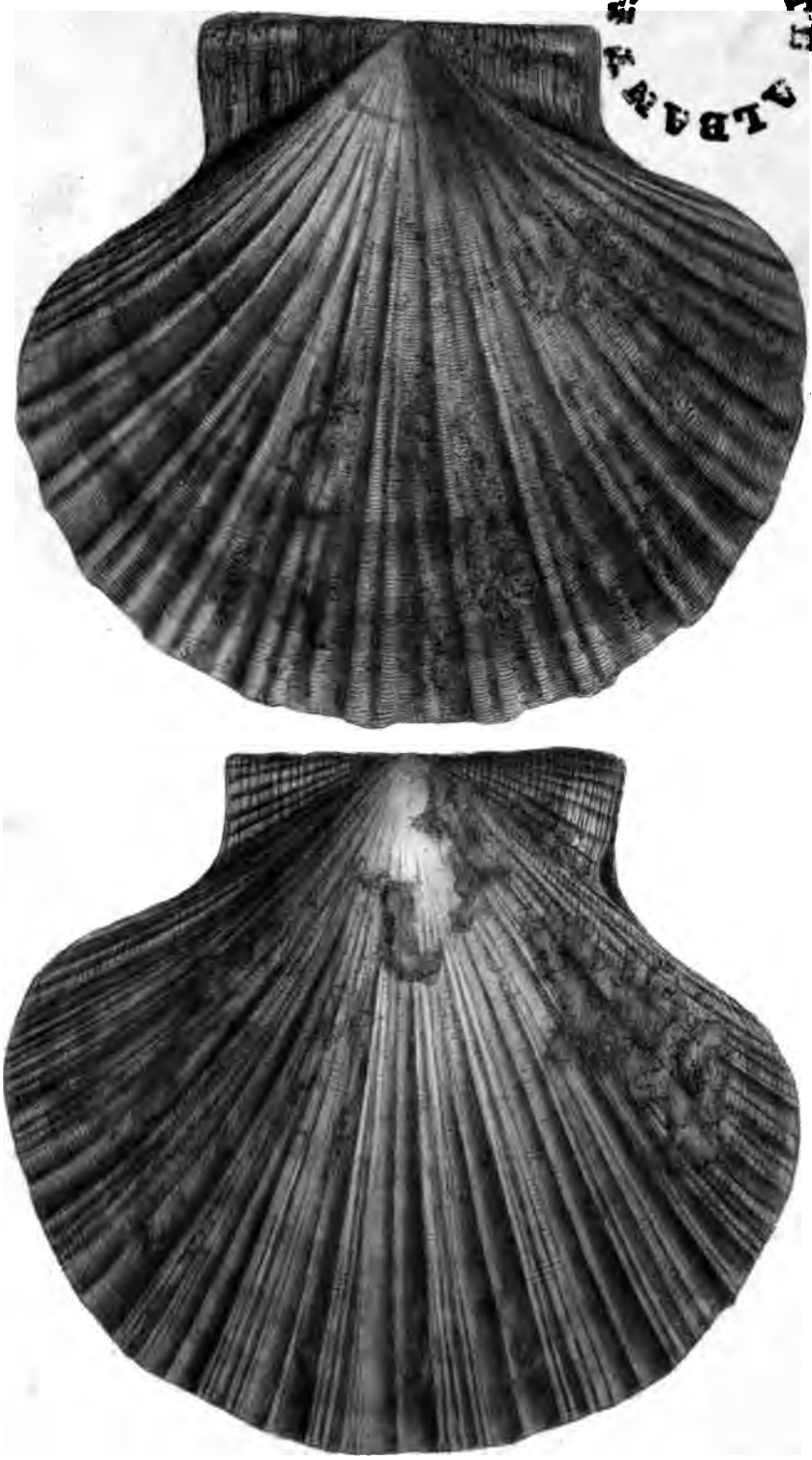

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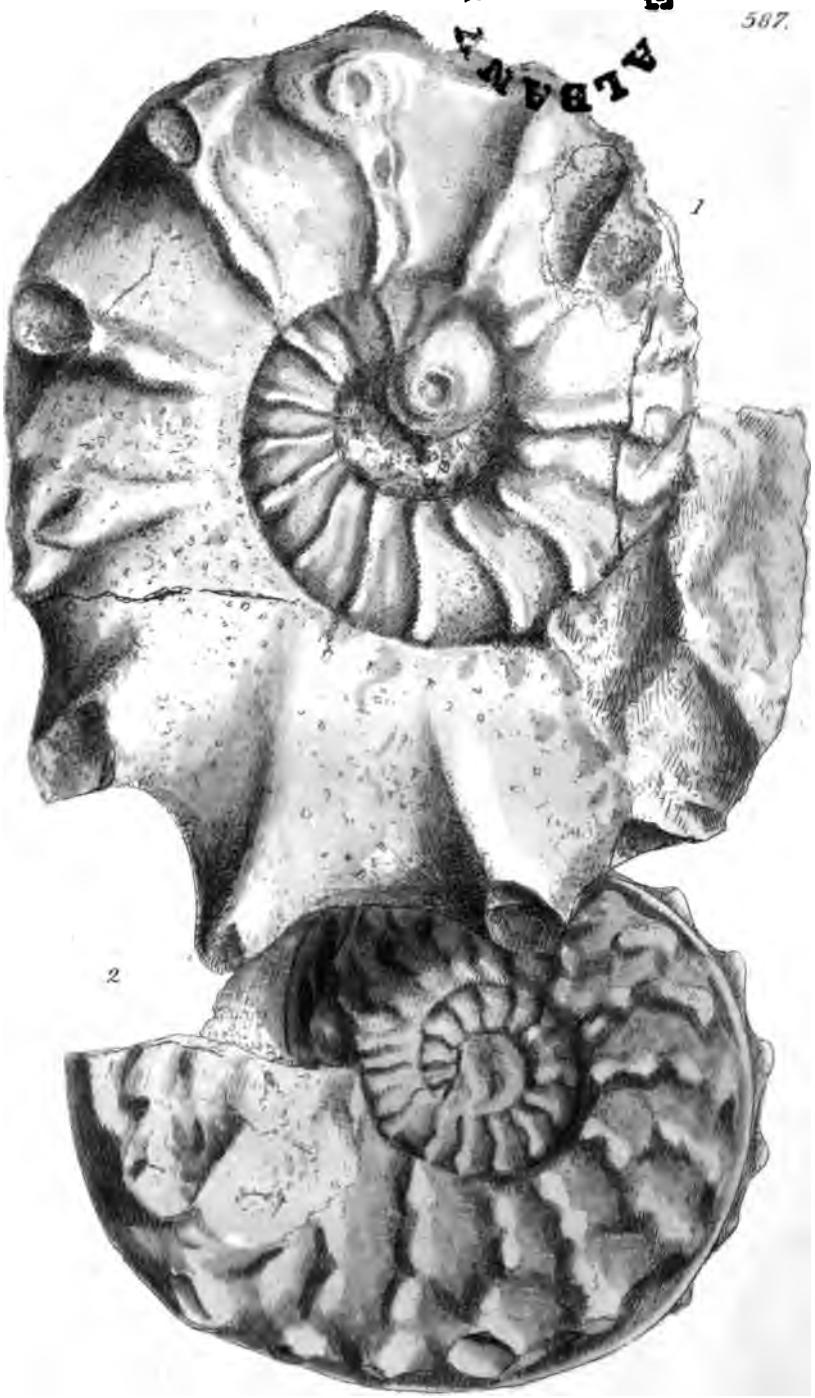

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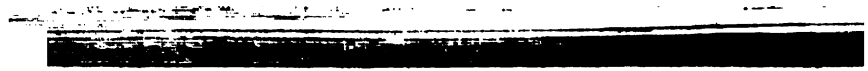

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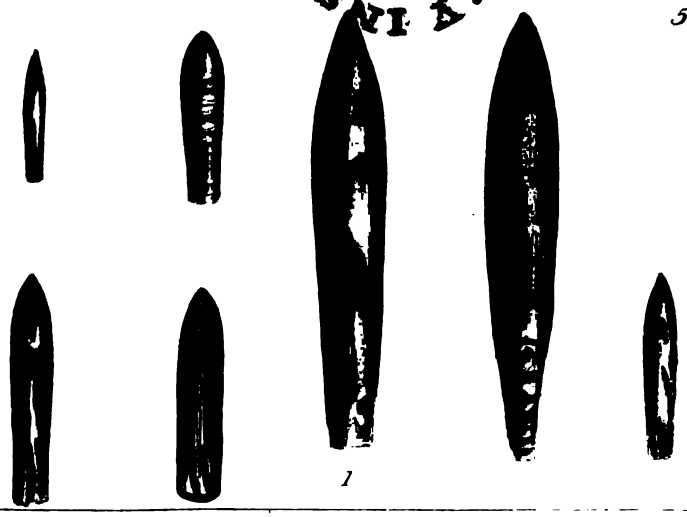

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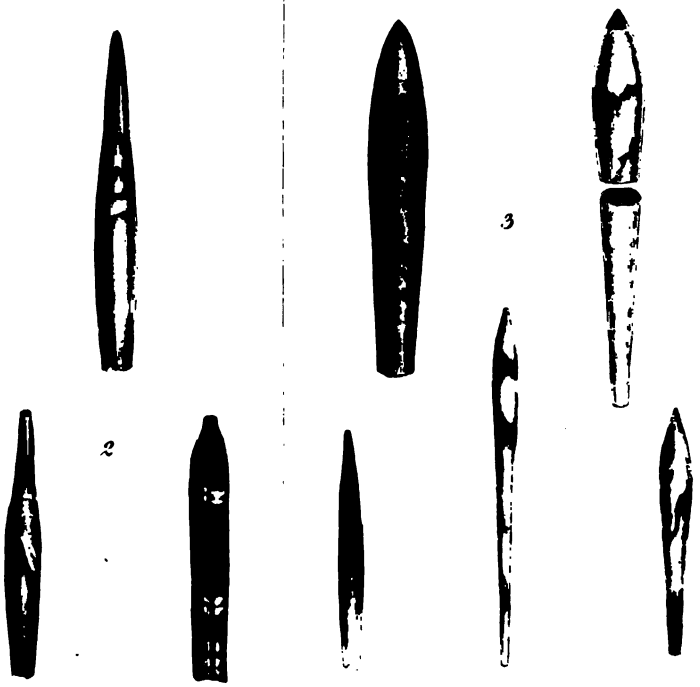

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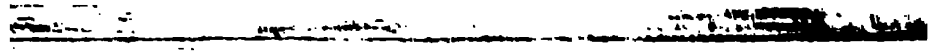

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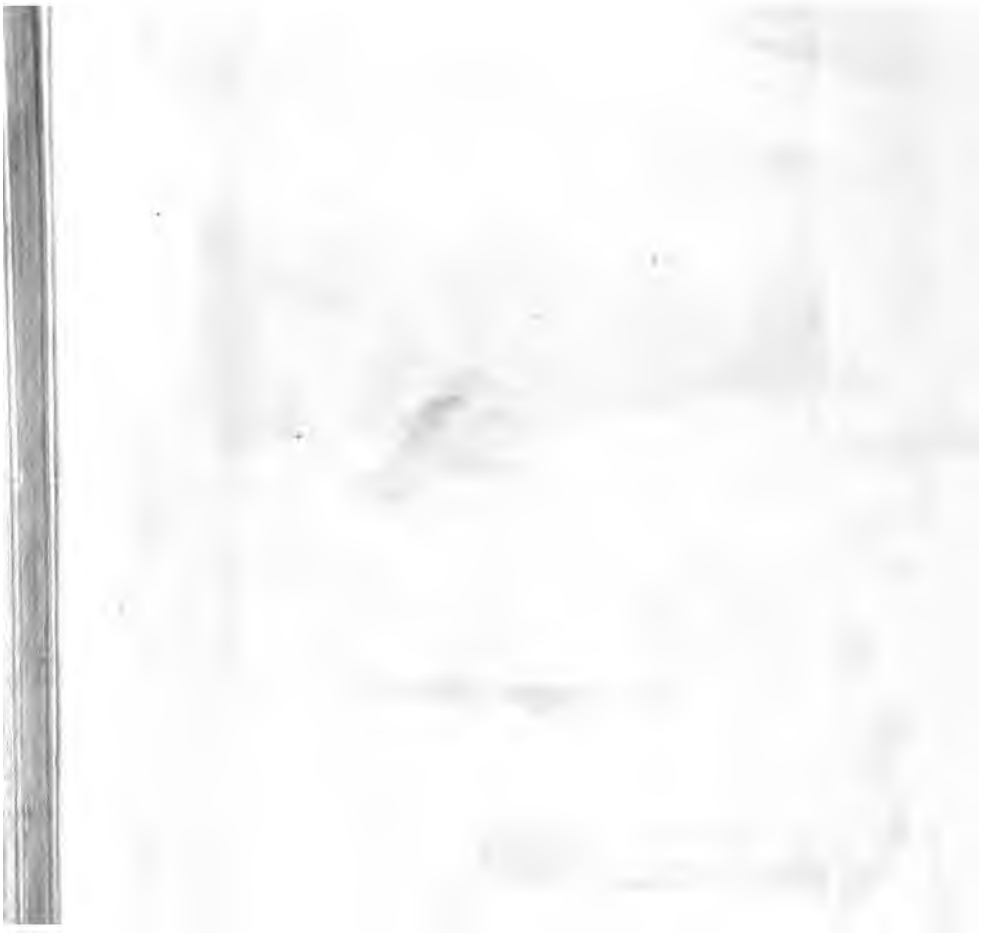

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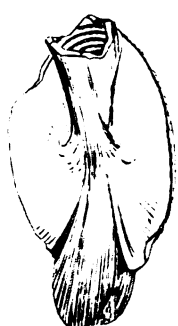

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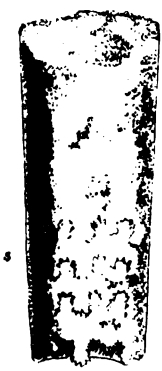

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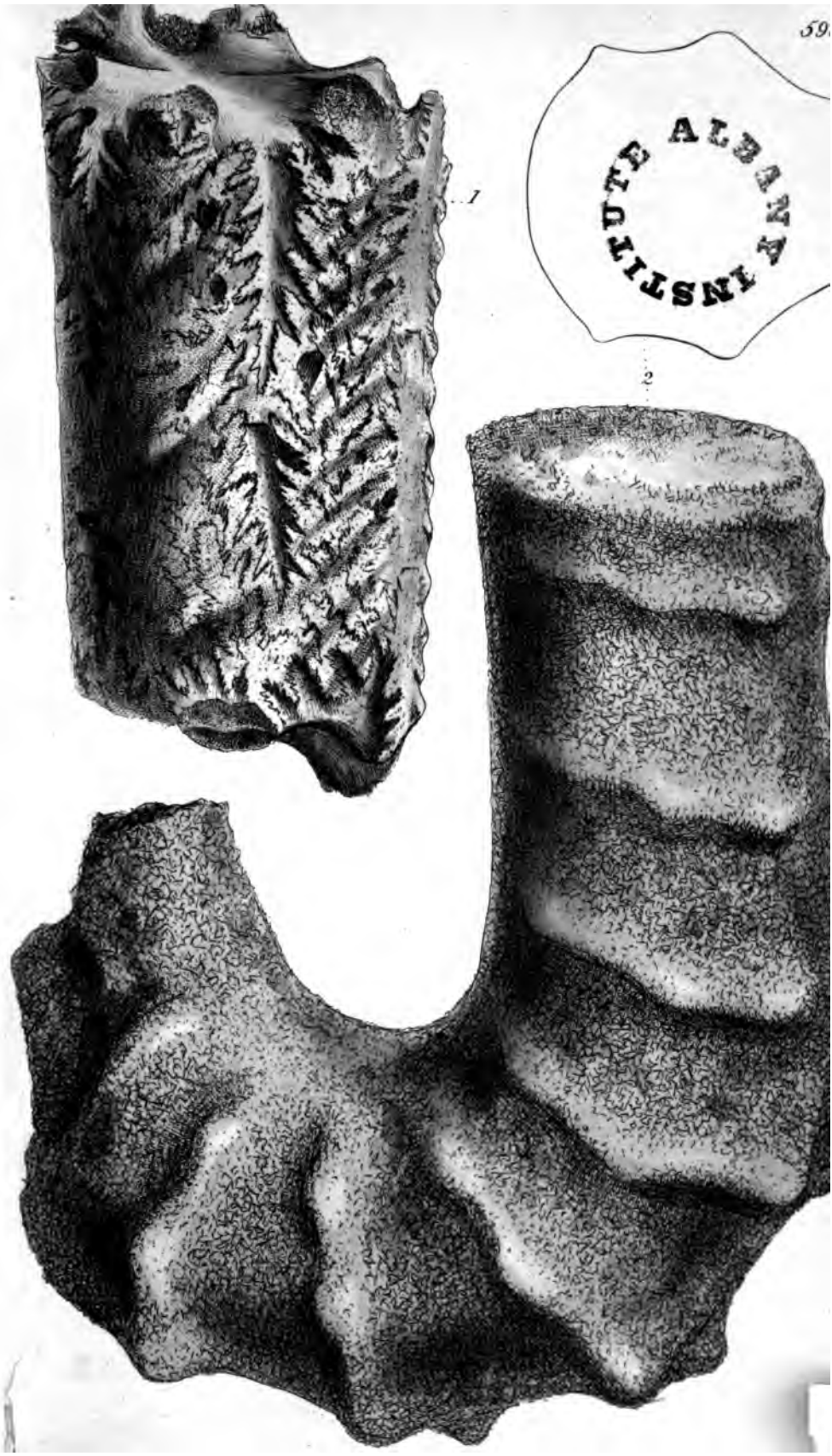

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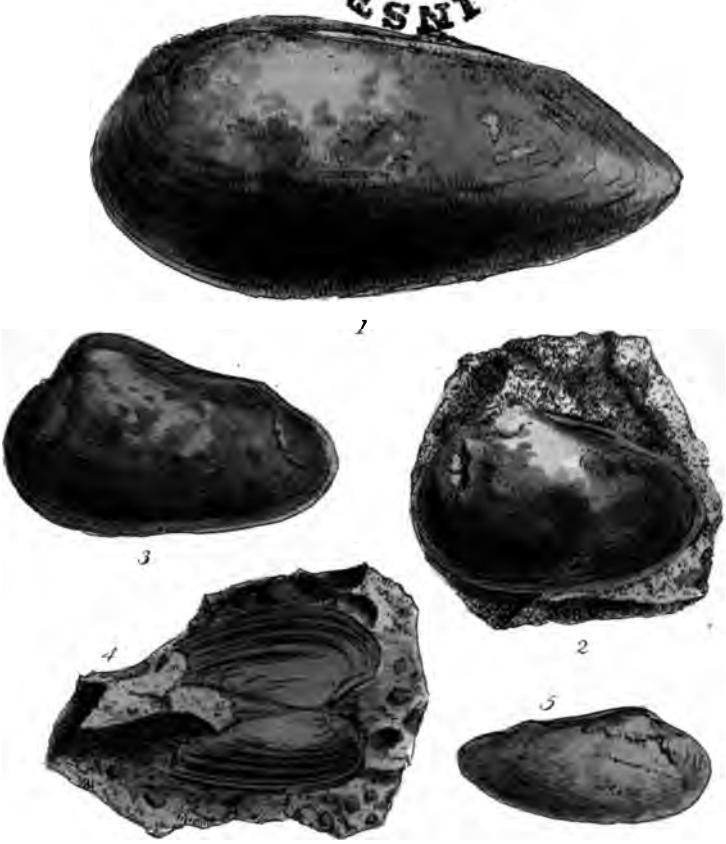

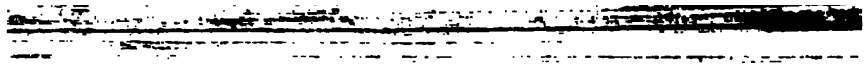

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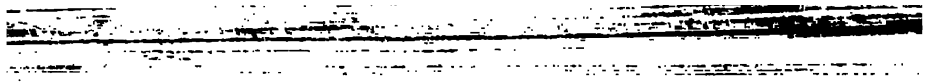

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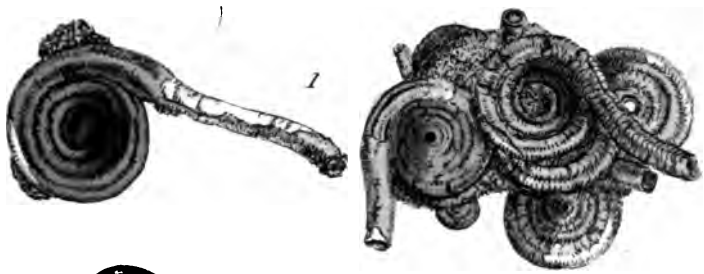

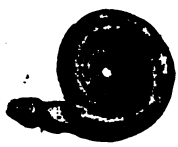

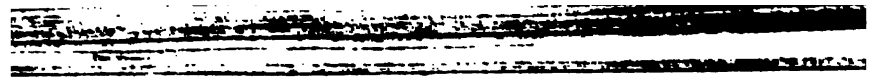

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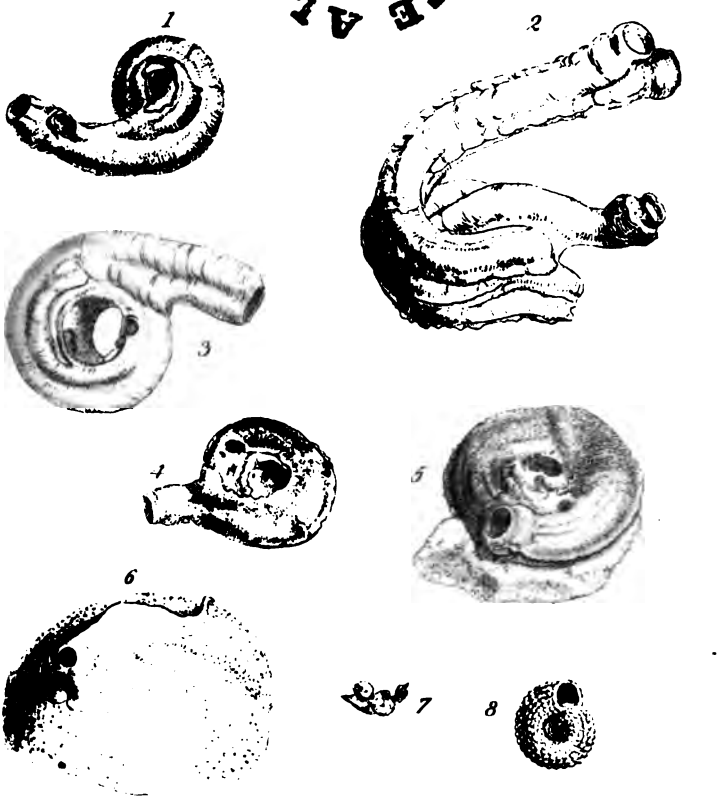

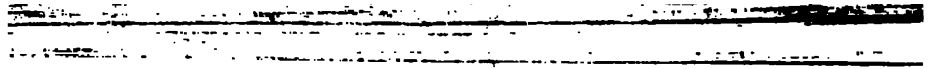

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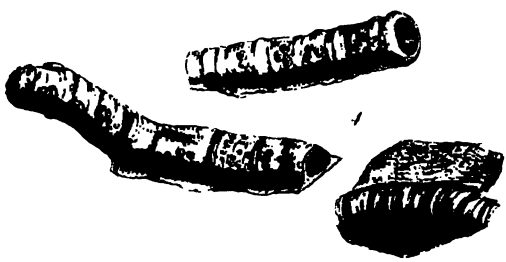

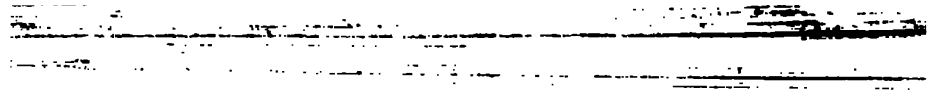

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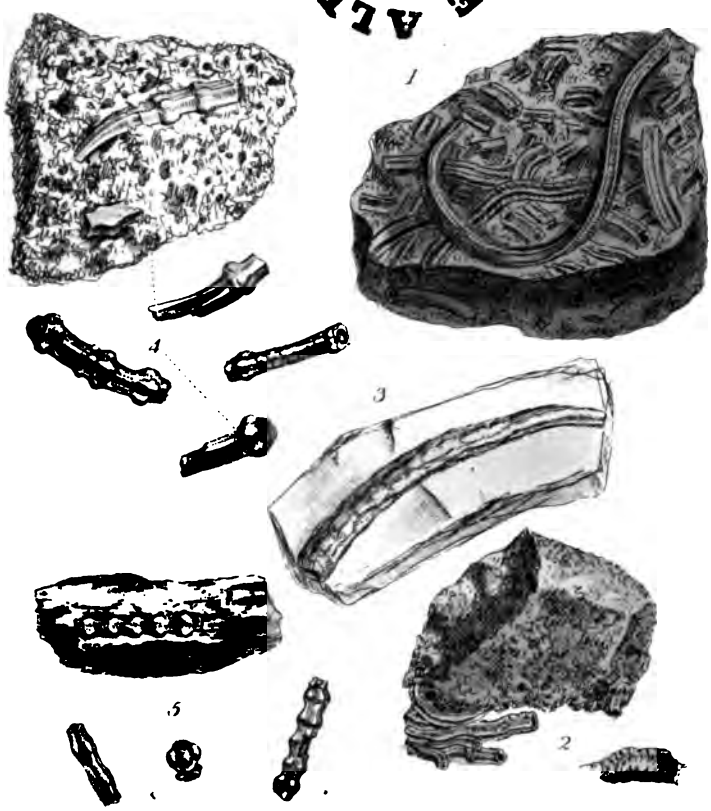

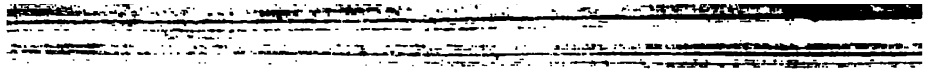

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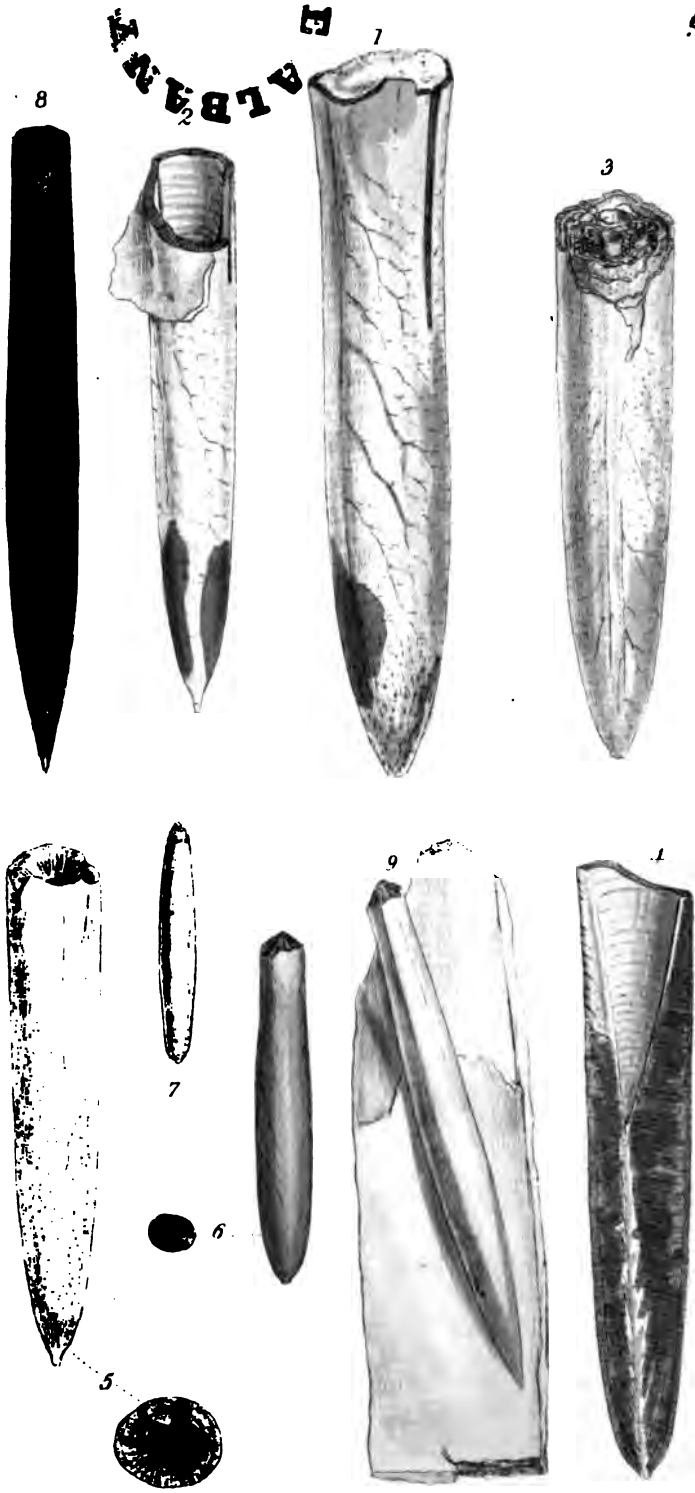

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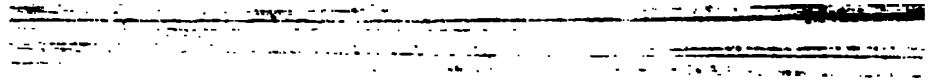

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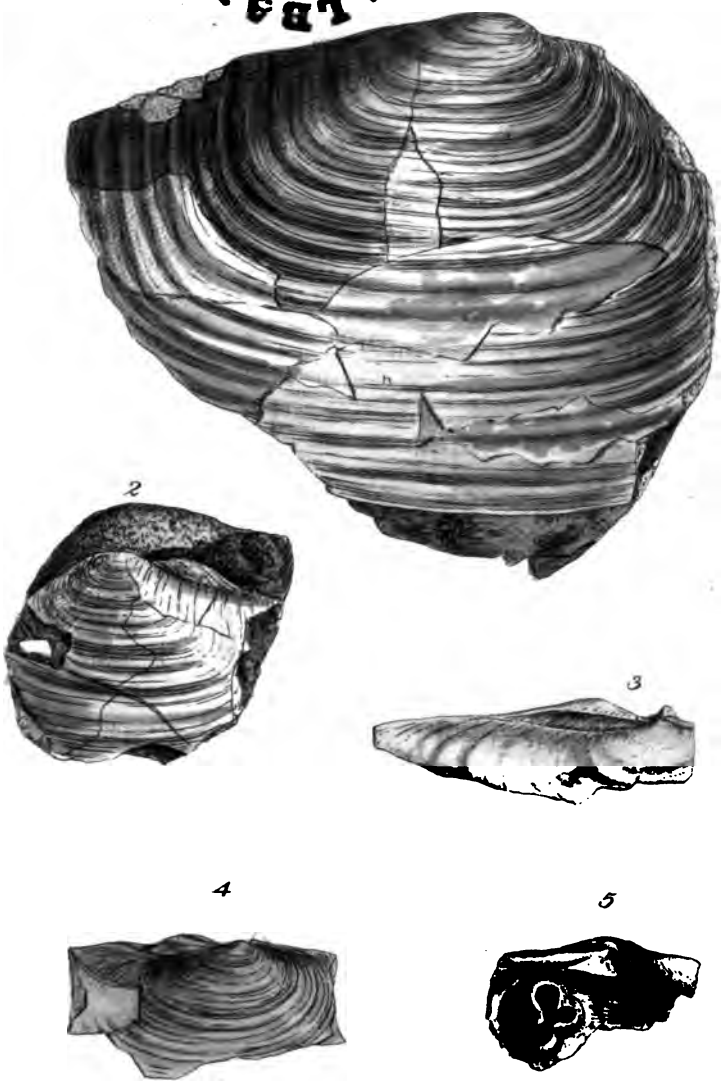

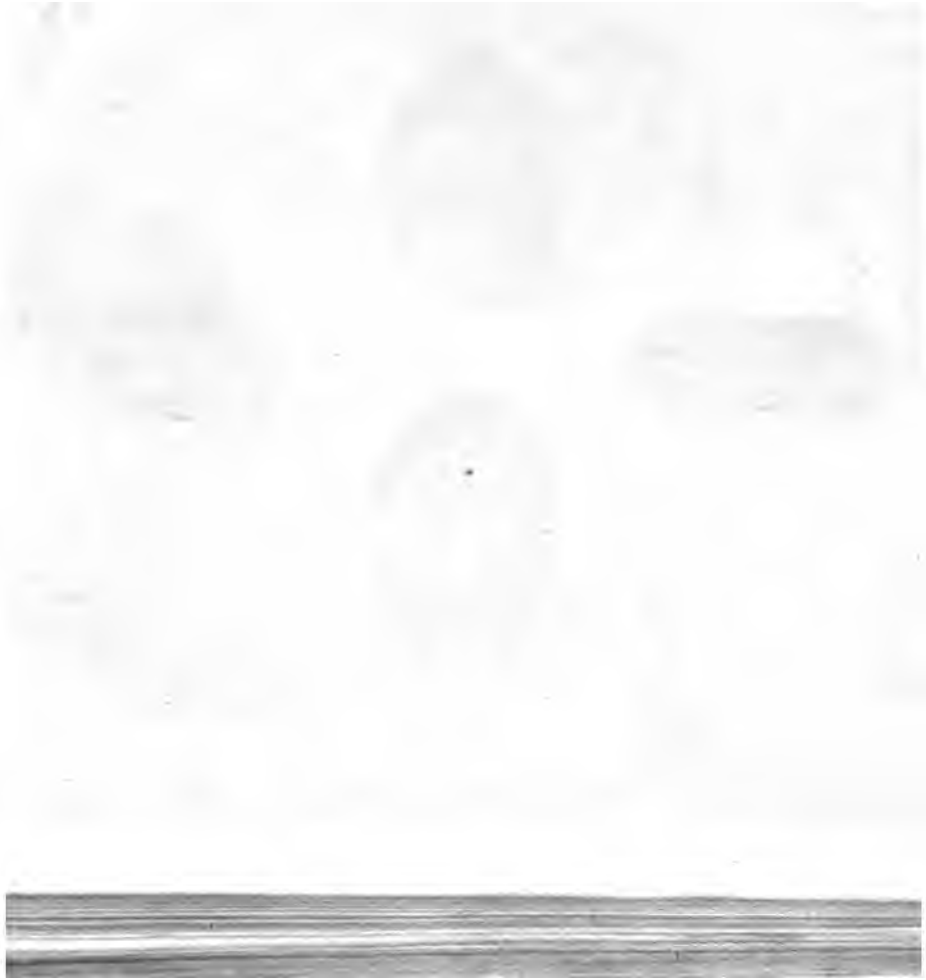

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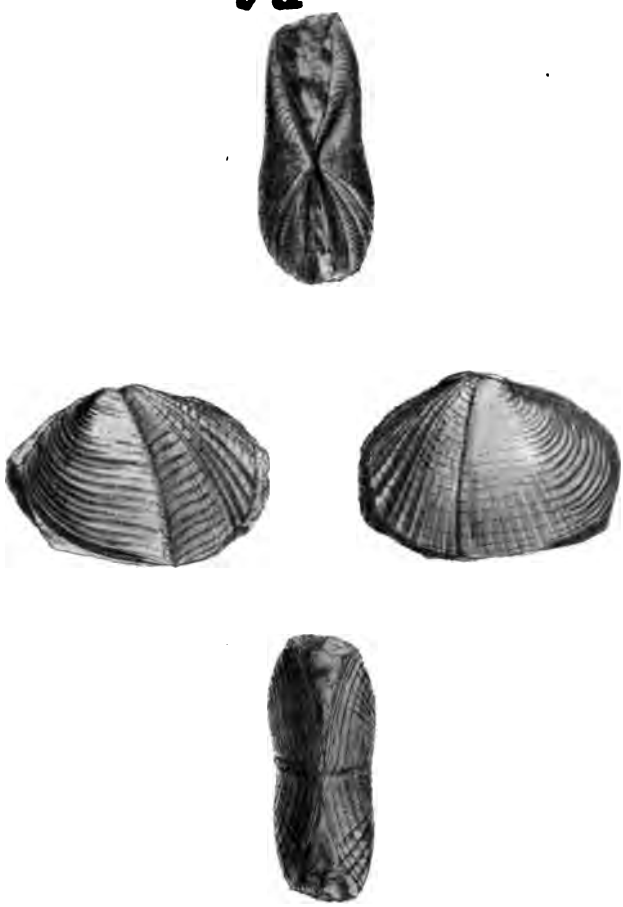

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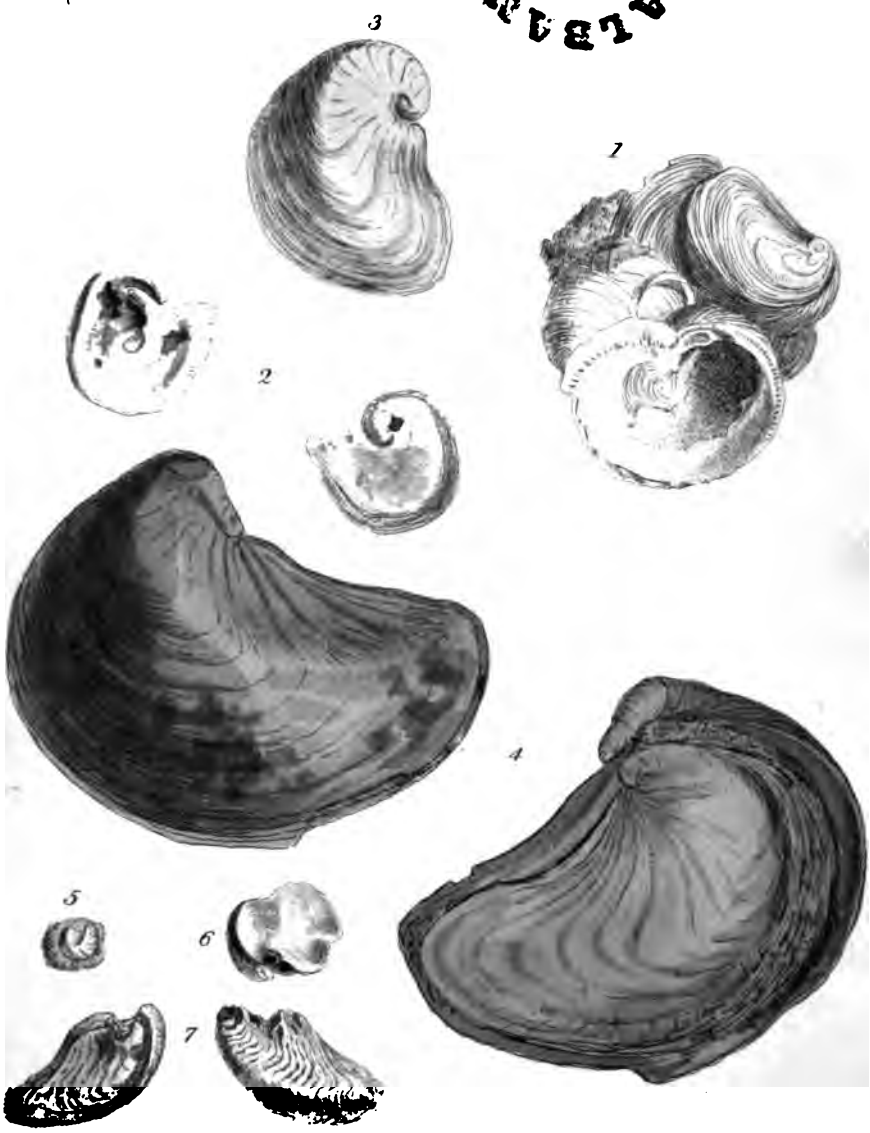

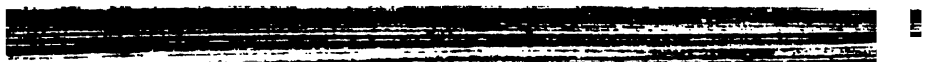

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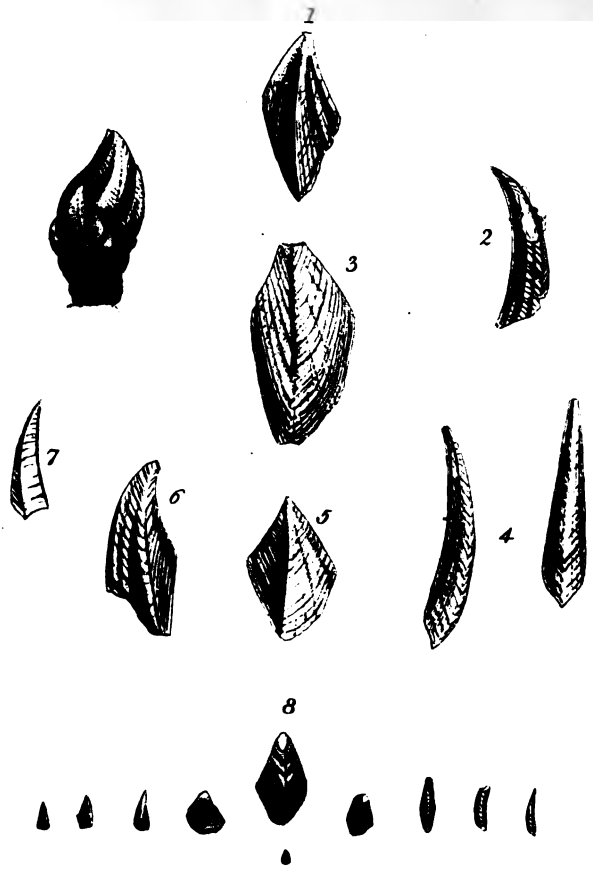

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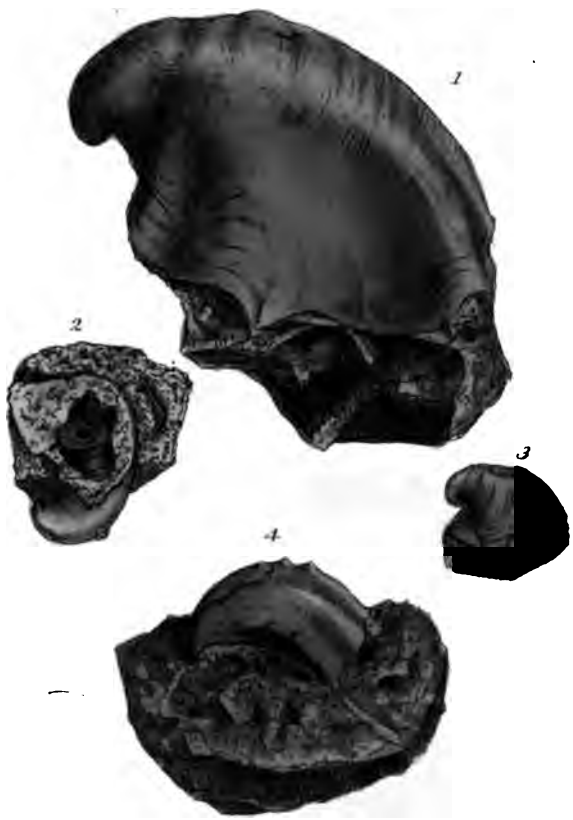

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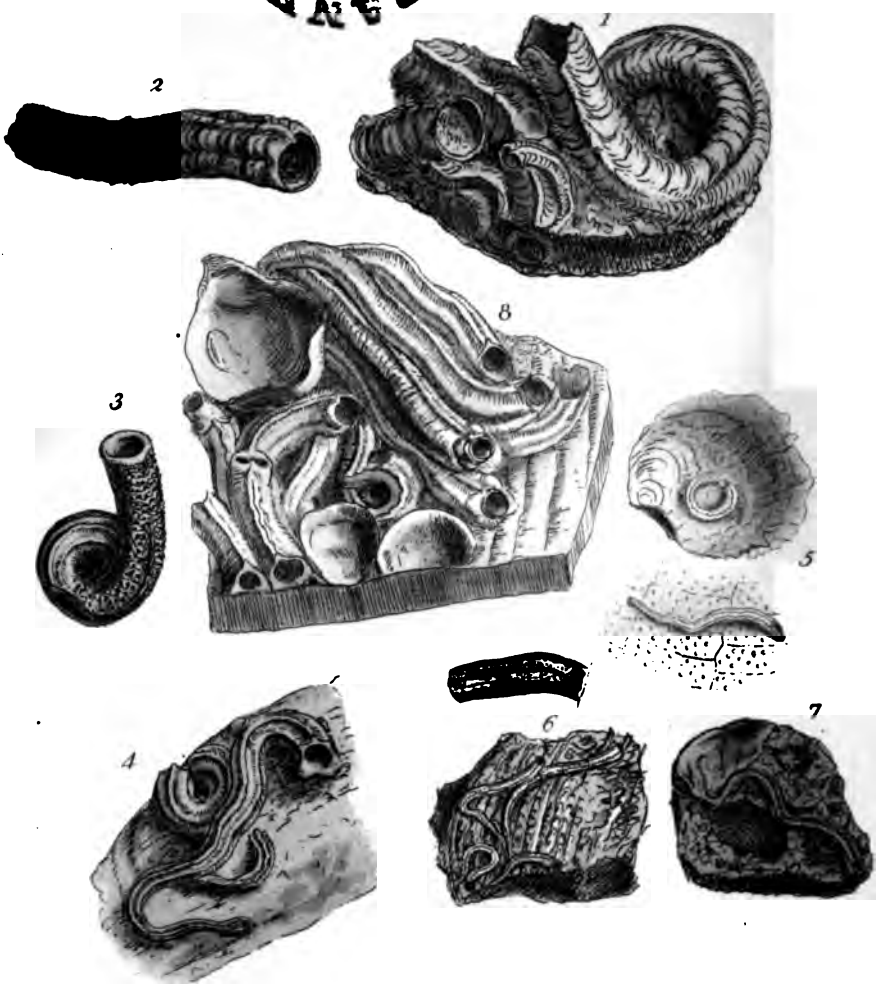

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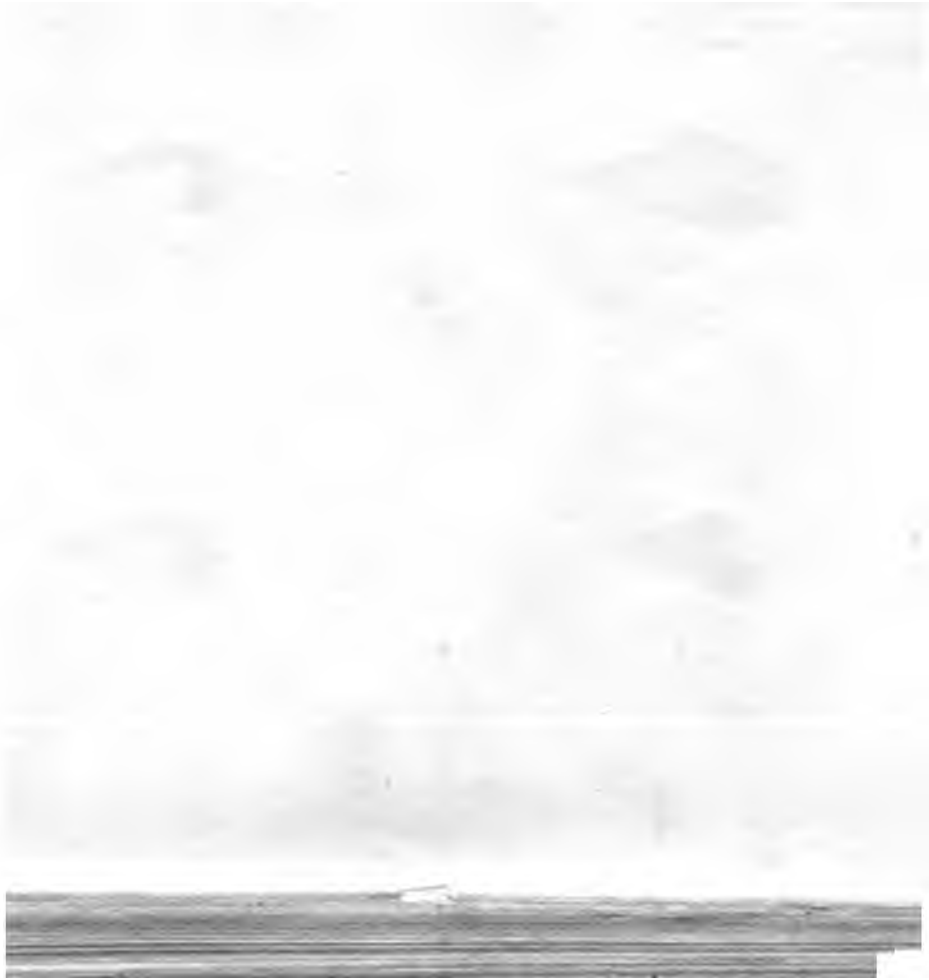

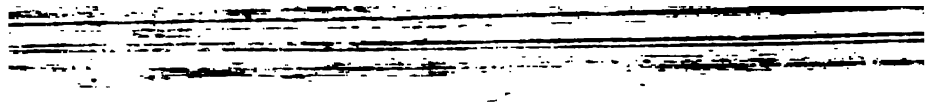

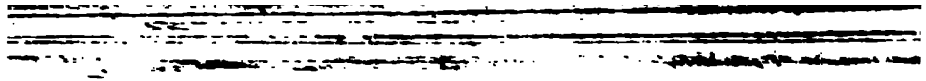

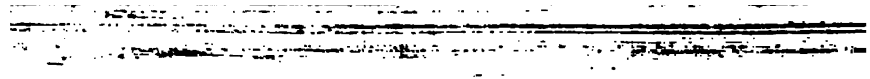

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